

THE SCITAMINEÆ OF THE PHILIPPINE ISLANDS.

By H. N. RIDLEY.

(Director, Botanic Garden, Singapore, Straits Settlements.)

This account of the *Scitamineæ* of the Philippine Islands is based on the whole series of specimens in the herbarium of the Bureau of Science, Manila, kindly placed in my hands by Mr. Elmer D. Merrill, which contains a very fine series of specimens of this group collected by many botanists in different islands of the Archipelago, and also collections made by Mr. A. D. E. Elmer.

Among the earlier collectors in the Philippines were Haenke, Cuming, and Blanco. The first of these collected a good number of species which were described and figured by Presl in "*Reliquiae Haenkeanae*." The types of Presl's species I have not seen; nearly all have been re-collected, but one or two do not seem to have been met with again. Cuming seems to have obtained comparatively few species of the order. Blanco described a small number, chiefly cultivated species, in the first and second edition of his "*Flora de Filipinas*," some of which are figured by Naves in the third edition. Warburg also made extensive collections in the Archipelago, and several of the species described by K. Schumann in the "*Pflanzenreich*," based on material collected by the former, I have not been able to identify with any of the plants collected by the American botanists, and to complete this account I have had to copy Schumann's descriptions.

The area does not seem to be so rich in this group of plants as are the Malay Islands farther west, or the Malay Peninsula. The number of genera, twenty-one, is not quite so large and the number of species is much smaller than in the Malay Peninsula. Of the indigenous genera we have *Globba*, *Hedychium*, *Gastrochilus*, *Zingiber*, *Hornstedtia*, *Amomum*, *Plagiostachys*, *Alpinia*, and *Costus* in *Zingiberaceæ*, and *Phrynium*, *Phacelophrynium*, and *Donax* in *Marantaceæ*, with the endemic genera *Kolowratia*, *Leptosolena* and *Adelmeria* (*Zingiberaceæ*), and *Monophrynium* (*Marantaceæ*). Of the genera found in the Malay Peninsula and Archipelago, not yet met with in the Philippines, are *Odontychnum*, *Camptandra*, *Haplochorema*, *Conamomum*, *Elettariopsis*, *Geostachys*,

Geocharis and *Lowia*, and, except as introduced plants, *Curcuma*, *Kaempferia* and *Phaeomeria*.

Some notes on the distribution of the sections of the genera represented may be of interest. It is noticeable that in the genus *Globba* nearly all the species are white-flowered with but few yellow, while in India and the Malay Peninsula yellow-flowered ones predominate. In Borneo yellow ones become rare and white preponderate, and this is further accentuated in the Philippines. *Hedychium* is a genus of two groups, the terrestrial ones whose headquarters is in India, and the epiphytic ones of the tropical forests from Sumatra and the Malay Peninsula to the Philippines. *H. coronarium*, the only terrestrial species in the Philippines, is widely distributed throughout the eastern islands, but perhaps only introduced from the west. *Zingiber* is one of the genera of which herbarium specimens, unless specially carefully prepared and selected, are generally unidentifiable. It is usually necessary to take the flowers from the water-saturated spike and dry them separately in the field, as they perish or become unrecognizable often before one reaches camp. It is therefore often difficult to get a clear idea of the number of species and their relationships when one has to deal with material dried roughly and without special preparation, such as is found in ordinary collections. *Hornstedtia* is abundant in the Malay Peninsula, and in Sumatra, Borneo and Java; it thins out towards New Guinea, and as yet but two species have been found in the Philippines. *Amomum* does not appear to be strongly represented, but as these plants are often not very free-flowered we shall probably get more species later as collecting goes on. Two of the species described by Schumann under the section *Bintalua* appear from the descriptions to be species of *Plagiostachys*.

Plagiostachys, a genus of but few known species, seems to be better represented here than elsewhere, as there appear to be three Philippine species. It ranges from the Malay Peninsula eastwards. *Costus*, typically an American genus, is represented by a few species in the East Indies, and in the Philippines by two, one widely distributed throughout the East, another endemic and allied to a Malayan species. *Alpinia* is the most strongly represented genus in the Philippines; it is a typical eastern Asiatic one, ranging to Japan and Polynesia, beyond the region of most of the tropical Asiatic genera.

The *Marantaceæ* all belong to Malayan genera and are all allied to species of the Malay Peninsula except the endemic genus *Monophrynium*. The *Cannaceæ* are represented only by introduced species. *Lowiaceæ* are absent. The *Musaceæ* are represented by the introduced *Ravenala madagascariensis*, some distinct species of *Musa*, and many forms of *Musa sapientum* Linn. and *M. paradisiaca* Linn. Material in this group has not as yet been collected by the American botanists, and there are no specimens in the collection sent to me.

Synopsis of the genera.

Genus.	Species of the Malay Peninsula.	Species of the Philip- pines.	Endemic in the Phil- ippines.	Introduced into the Philip- pines.	Philippine species extending to other islands.
<i>Globba</i>	16	10	7	0	3
<i>Hedychium</i>	4	2	1	1	0
<i>Kaempferia</i>	2	1	0	1	0
<i>Gastrochilus</i>	18	1	1	0	0
<i>Curcuma</i>	4	2	0	2	0
<i>Costus</i>	4	2	1	0	1
<i>Zingiber</i>	11	5	4	0	1
<i>Amomum</i>	11	8	8	0	0
<i>Hornstedtia</i>	13	4	4	0	0
<i>Phacomeria</i>	4	1	0	1	0
<i>Adelmeria</i> ^a	0	2	2	0	0
<i>Plagiostachys</i>	2	3	3	0	0
<i>Alpinia</i>	18	16	15	0	1
<i>Kolouratia</i> ^a	0	2	2	0	0
<i>Leptosolena</i> ^a	0	2	2	0	0
<i>Donax</i>	3	1	0	0	1
<i>Phrynium</i>	3	1	1	0	0
<i>Phacelophrynium</i>	1	2	2	0	0
<i>Monophrynium</i> ^a	0	3	3	0	0
Total	114	68	56	5	7

^a Genera endemic in the Philippines.

SCITAMINEÆ.

§ 1. ZINGIBERACEÆ. Aromatic plants. Fertile stamen one, 2-celled.

Staminodes 2, broad and petaloid.

Spike or panicle terminal on a leafy stem.

Filament long, slender, exceeding the corolla.

Lip adnate to the filament above the corolla..... 1. *Globba*Lip free 2. *Hedychium*

Filament shorter than the corolla, broad.

Anther-cells on a broad thin connective..... 3. *Kaempferia*Anther-cells thick, fleshy..... 4. *Gastrochilus*Spike radical, cone-like 5. *Curcuma*

Staminodes small or absent.

Leafy stems not spiral; ligule oblong.

Spikes radical.

Anther with a long, curved beak..... 6. *Zingiber*Anther with two curved arms; lip broad..... 7. *Amomum*

Anther crestless; lip narrow.

Spike obconic or cylindric..... 8. *Hornstedtia*Spike on a tall peduncle, hemispheric..... 9. *Phacomeria*Spikes lateral from a leafy stem..... 10. *Plagiostachys*

Inflorescence terminal on the leafy stem.

Inflorescence dense, subglobose, with large bracts..... 11. *Adelmeria*

Inflorescence lax, or of several spikes.

Corolla-tube long, slender 12. *Leptosolena*

Corolla-tube short, thick.

Panicle-branches spicate, with close-set bracts..... 13. *Kolowratia*

Panicle-branches lax, the bracts small, caducous..... 14. *Alpinia*

Leafy stem spiral; ligule annular; spike terminal or radical..... 15. *Costus*

§ 2. MARANTACEÆ. Non-aromatic. Fertile stamen one, with a single cell on the edge, the three others petaloid, irregular.

Stems erect, shrubby, branched..... 16. *Donax*

Stemless plants.

Inflorescence paniced, from the side of a petiole, spikes elongate.

17. *Phacelophrynium*

Spikes in a dense lateral head..... 18. *Phrynium*

Spikes in small heads; flowers solitary in the bracts..... 19. *Monophrynium*

§ 3. CANNACEÆ. Non-aromatic. Panicle terminal. Stamens regular, petaloid, one with a lateral anther-cell..... 20. *Canna*

§ 4. MUSACEÆ. Stamens five, non-petaloid; petals and sepals each connate into one organ 21. *Musa*

1. GLOBBA L.

Slender herbs with a short rhizome. Leaves ovate or lanceolate, thin, sheathing, with a small ligule. Inflorescence terminal, paniced, lax. Flowers small, yellow, white, or violet. Calyx tubular, 3-toothed, regular or irregular. Corolla-tube longer, 3-lobed, lobes boat-shaped, deflexed. Staminodes similar. Lip-base adnate by its edges to the stamen, forming a tube, the limb narrow, deflexed, usually bilobed, rarely entire, the filament much longer, erect, slender. Anther small; connective prolonged laterally into a simple margin, or with two to four triangular spurs. Style longer, slender; stigma very small, cup-shaped. Ovary 1-celled, the placentas 3, parietal. Capsule globose, smooth or warted, succulent, dehiscing irregularly. Seeds small, with a white aril.

Species about 80, extending from India to Siam, southern China, and the Malay Peninsula and Archipelago.

§ CERATANThERA. Anther-spurs one on each side.

Flowers yellow.

A tall stout plant, the panicle pyramidal..... 1. *G. pyramidata*

A weak small plant, the panicle slender..... 2. *G. parviflora*

Flowers white.

Leaves glabrous.

Anther-spurs linear, acuminate 3. *G. campsophylla*

Anther-spurs triangular.

Calyx turbinate 4. *G. brevifolia*

Calyx cylindrical 5. *G. Merrillii*

Leaves pubescent beneath.

Sheaths pubescent.

Staminodes lanceolate, acute 6. *G. gracilis*

Staminodes oblong, blunt 7. *G. latifolia*

Sheaths glabrous 8. *G. leucocarpa*

§ MARANTELLA. Anther-spurs two on each side.

Flowers yellow 9. *G. marantina*

Flowers black or violet 10. *G. ustulata*

1. *G. pyramidata* Gagnepain in Bull. Soc. Bot. France IV 1 (1901) 204, pl. 4, f. 7-10; K. Schum. in Pflanzenreich 20 (1904) 146.

A tall plant 70 to 90 cm tall, glabrous. Lower sheaths narrow, obtuse, apiculate. Leaves linear-lanceolate or lanceolate, attenuate-acuminate, with a long tail, the base acute, glabrous except for the tip, sometimes ciliolate and hairy, 10 to 25 cm long, 1.5 to 3.5 cm wide; ligule 2 mm long, truncate, glabrous. Panicle pyramidal, somewhat nodding, 8 to 10 cm long. Flowers yellow, sessile and on peduncles 2 to 3 cm long. Calyx shortly toothed, 4 mm long, turbinate. Corolla-tube 1.2 to 1.3 cm long. Staminales lanceolate, acute. Lip short, broad, shortly bilobed. Anther with two short lunulate wings.

BUNUAN ISLAND, near Mindanao (*Montano 203*¹), in Herb. Mus. Paris. Also found in Cambodia.

The figure resembles *G. Merrillii*, but that species has white, not yellow flowers.

2. *G. parviflora* Presl Rel. Haenk. 1 (1827) 115; K. Schum. in Engl. Bot. Jahrb. 27 (1899) 330; Pflanzenreich l. c. 146.

Stem slender, about 40 cm tall. Leaves linear-lanceolate, acuminate, attenuate, the base acute or rounded, glabrous, 30 cm long, 2 to 3 cm wide. Panicle weak and lax, 8 to 9 cm long, the branches few, slender, the lower ones 3 cm long. Bracts linear-oblong, obtuse, 1 to 3 mm long, persistent. Calyx funnel-shaped, 3-toothed, one tooth blunt, the other two mucronate. Corolla-tube slender, thrice as long, the lobes oblong, 4 mm long, concave, yellow. Staminales widely linear-lanceolate, acuminate, a little longer. Lip subcuneate, bilobed, 5 mm long. Anther-spurs rising from a little above the base, subulate, curved.

LUZON, Province of Sorsogon, (*Haenke*): Province of Albay, Mount Mayon, *Bur. Sci. 2910 Mearns*: Province of Tayabas, Sampaloc, (*Warburg*): Province of Rizal, Bosoboso, *Merrill 2782, 2783*.

A small weak plant remarkable for its yellow flowers. It has a tendency to have all the flowers secund, that is, turned upwards on one side. Endemic.

3. *G. campsophylla* K. Schum. in Pflanzenreich l. c. 145.

G. parviflora Vidal Phan. Cuming. Philip. (1885) 152; K. Schum. in Engl. Bot. Jahrb. 27 (1899) 330, non Presl.

A slender plant about 50 to 60 cm tall. Leaves narrowly lanceolate, acuminate, with a long point, glabrous, narrowed a little abruptly at the base and shortly petioled, 9 to 15 cm long, 1 to 2 cm wide; petiole about 3 mm long; ligule very short, rounded, truncate, quite glabrous. Panicle 9 cm long, lax, with slender branches 3 cm long. Bracts linear-oblong, rounded, glandular-dotted, 2 mm long. Flowers white, on short articulations. Calyx funnel-shaped, with three, equal, ovate lobes, keeled and shortly mucronate, glandular-dotted. Corolla-tube slender, three times as long as the calyx, the lobes oblong, the upper one hooded, all glandular-dotted. Staminales linear, longer, obtuse, glandular-dotted and pubescent. Lip rather deeply bilobed, the lobes linear, obtuse, glandular-dotted. Anther strongly glandular-dotted on the back, the spurs linear, acuminate, curved, much longer than the anther. Fruit rather large,

¹ Specimens cited in parenthesis not seen.

globose or oblong, about 1 cm long, glandular-dotted. Seeds numerous, covered with a white silky pubescence, and with a finely cut aril at the base.

LUZON, Province of Nueva Ecija, *Cuming 1390*: Province of Cavite, Maragondong, *Merrill 4177*: Province of Bataan, Lamao River, *For. Bur. 1461 Ahern's collector*: Province of Rizal, Bosoboso, *Bur. Sci. 1110 Ramos*: Province of Bulacan, *For. Bur. 7208 Curran*. SAMAR, Catubig River, *Merrill 5207*. MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 417*: Province of Surigao, *Bolster 338*: District of Zamboanga, *Copeland s. n.*: District of Davao, Malita, *Copeland 662*.

Endemic.

4. *G. brevifolia* K. Schum. in *Pflanzenreich* l. c. 145.

G. parvifolia Presl var. *brevifolia* K. Schum. in *Engl. Bot. Jahrb.* 27 (1899) 330.

A slender plant with stems 10 to 20 cm long. Leaves four or five only, sessile or very shortly petioled, lanceolate or suboblong-lanceolate, rather long attenuate-acuminate, hardly caudate, the base rounded, sometimes subcordate, quite glabrous except for a few scattered hairs especially at the tip, 5 to 6 cm long, 1.3 to 2 cm wide; ligule very short, scarcely 0.5 mm long, ciliolate as is also the sheath. Panicle 4 to 6 cm long, lax. Lower bracts minute, scarcely 1 mm long, suborbicular, rounded at the tip, the upper ones twice as long, ovate or acuminate, persistent. Branches capillary, 1 to 2 cm long, glabrous. Flowers long-pedicelled. Bracteoles resembling the bracts, persistent. Ovary ellipsoid, 2 mm long, glabrous, smooth. Calyx turbinate, with three obtuse lobes. Corolla not described. Anther with a triangular wing on each side.

LUZON, Province of Zambales, near Palauig, (*Warburg 14066*), in *Herb. Berol.*
Endemic.

5. *G. Merrillii* Ridl. in *Govt. Lab. Publ. (Philip.)* 35 (1905) 83.

A rather stout plant with long woolly tufted roots, the stem 60 to 90 cm tall. Leaves broadly lanceolate, long and very gradually acuminate, 12 to 20 cm long, 3 to 6 cm wide, the base rounded, inequilateral; petiole 2 to 3 mm long; ligule very short, truncate; all glabrous, except occasionally the lower leaves which are pubescent at the base. Panicle lax, 15 cm long, with remote 2 cm long branches. Bracts lanceolate, acute, caducous. Flowers white. Calyx-tube cylindric, very shortly and equally toothed. Corolla-tube slender, more than twice as long as the calyx, the lobes oblong-obovate, glandular-dotted. Staminodes smaller. Lip linear-oblong, entire, rounded at the tip, spoon-shaped, short. Filament short and broad. Anther elliptic, the spurs elongate, triangular, longer than the anther.

LUZON, Province of Bataan, Mount Mariveles, *Merrill 3869*, *Whitford 481*, *Leiberg 6158*, *For. Bur. 1598 Borden*.

Endemic.

6. *G. gracilis* K. Schum. in Pflanzenreich l. c. 145.

Slender, stems 25 to 35 cm tall, the five lowest sheaths narrow, acute, pilose and ciliate. Leaves 7 or 8, sessile or very shortly (2 mm) petioled, lanceolate or suboblong-lanceolate, acuminate, not distinctly caudate, the upper surface papillose rather than pilose, beneath pilose, 3.5 to 9 cm long, 1.2 to 2.5 cm wide; ligule scarcely 1 mm long, truncate, pilose. Panicle 4.5 to 6.5 cm long, minutely pilose, the lower branches 3.5 cm long, with 4 or 5, rarely 6, flowers. Bracts very caducous. Bracteoles minute, 1 to 1.5 mm long, oblong-ovate, obtuse, caducous. Ovary glabrous, scarcely 1 mm long. Calyx 3 mm long, very shortly toothed. Corolla-tube very slender, 1.7 cm long, the lobes 3 mm long. Staminalodes lanceolate, acute, 4 mm long. Lip 5 mm long, bilobed. Anther oblong, the spurs curved upwards, acuminate.

MINDANAO, District of Davao, Mount Dagatpan, (*Warburg 15480*), in forests, 300 to 1,000 m altitude: Province of Misamis, Mount Malindang, *For. Bur. 4572 Mearns & Hutchinson*. NEGROS, *Elmer 10033*.

Endemic.

7. *Globba latifolia* sp. nov.

Stem about 90 cm tall, the lower 30 cm covered with sheaths only, which are oblong, rounded at the tip, mucronate, pubescent. Leaves oblong-lanceolate, attenuate, acuminate, acute, not caudate, the base cuneate, the upper surface glabrous, the lower pubescent, 20 to 24 cm long, 3 to 4 cm wide; petiole very short; ligule short, rounded, ciliate; sheath strongly ribbed, the margins pubescent. Panicles 15 cm long, the branches spreading, remote, 3 to 4 cm long. Flowers sessile, white. Bracts caducous. Bracteoles ovate, acute, pallid, glandular-dotted. Calyx cylindric, slightly dilated upwards, the lobes equal, one-third the length of the calyx, oblong, obtuse, glandular-dotted. Corolla-tube twice as long as the calyx, rather thick, the lobes one-half as long as the tube, oblong, blunt. Staminalodes very similar, obtuse, linear-oblong. Lip short, bifid to the base and with two elliptic-ovate rounded lobes, the adnate portion of the lip deeply grooved and with two very distinct processes at the upper angle. Filament slender, 1 cm long. Anther oblong, with a pair of falcate, acuminate, appendages rising from the center of the side and longer than the anther. Fruit elliptic, 1 cm long, smooth. Seeds numerous.

MINDANAO, District of Zamboanga, San Ramon, *Copeland s. n.*, Sax River, *Williams 2324*. MINDORO, Baco River, *Merrill 4064*.

Very distinct among the Philippine species on account of its broad leaves, short flowers and short, deeply lobed lip.

8. *G. leucocarpa* sp. nov.

Whole plant 1 m tall, the sheaths glabrous. Leaves elliptic-lanceolate or lanceolate, acuminate, hardly caudate, the base rounded or shortly

narrowed, the upper surface glabrous, the lower thickly and minutely pubescent, more hairy along the midrib, 13 cm long, 2 to 3 cm wide; petiole very short; ligule short, glabrous. Panicle lax, 11 cm long, with numerous, remote, slender, spreading, 4 cm long branches. Bracts caducous, linear-oblong, obtuse, 3 mm long. Flowers white, nearly sessile, on short articulations. Bracteoles lanceolate, obtuse. Calyx infundibuliform, with three, unequal, ovate lobes which are keeled and mucronate, glandular-dotted. Corolla-tube twice as long as the calyx, slender, the lobes reflexed, boat-shaped, the upper one hooded, mucronulate. Staminalodes longer, linear, obtuse, thinner. Lip narrow, deeply bifid and with narrow blunt linear lobes. Anther-cells rather narrow, linear, the spurs lanceolate, acuminate, rather narrow, curved. Fruit white.

LUZON, Province of Benguet, Twin Peaks, *Elmer* 6465, on cliffs and stream banks. MINDORO, Baco River, *Merrill* 1789, 4064a; *McGregor* 201, in humid forests. LEYTE, Palo, *Elmer* 7298.

This species is distinguished by its quite glabrous sheaths and ligules, while the lower surface of the leaves is pubescent. It differs from *G. gracilis* K. Schum., not only in its glabrous sheaths, but also in its linear obtuse staminodes.

9. *G. marantina* Linn. Mant. 2 (1771) 170; Rose. in Trans. Linn. Soc. 8 (1807) 356; Monan. Pl. (1828) t. 111; Smith. Exot. Bot. 2 (1804) 85, t. 103; Roxb. Fl. Ind. 1 (1820) 77; Miq. Fl. Ind. Bat. 3 (1857) 561; Baker in Hook. f. Fl. Brit. Ind. 6 (1890) 206; Presl Rel. Haenk. 1 (1827) 115; K. Schum. in Pflanzenreich l. c. 156.

G. ectobolus K. Schum. in Pflanzenreich l. c. 156.

G. Barthei Gagnepain in Bull. Soc. Bot. France IV 1 (1901) 208; K. Schum. l. c. 169.

G. heterobractea K. Schum. l. c. 159.

A stout or slender plant 30 to 45 cm tall, the basal sheaths more or less hairy, always ciliate on the edge. Leaves lanceolate to ovate or elliptic-ovate, acuminate, 15 cm long, 6 cm wide, the base cuneate, the upper surface glabrous, the lower hairy; petiole very short and hardly distinct; ligule very short, rounded, hairy, ciliate on the edge. Panicle dense, very shortly peduncled, 4 cm long, at first fusiform, later dilated and almost oblong, the rachis hairy. Bracts persistent, ovate, rounded, glandular-dotted, ciliate on the edge and often pubescent all over, the lowest ones 1 cm long and containing bulbils, frequently all the bracts bulbiferous and flowerless. Bulbils conic, acuminate, green, warty when dry, frequently produced also in the axils of the leaves. Flowers yellow, on short branches, unilateral. Floral bracts oblong, cuspidate, glandular-dotted. Ovary warted, glabrous. Calyx tubular, hardly dilated upward, 3-toothed, two teeth mucronulate, one shorter, lanceolate, not mucronulate, all glandular-dotted. Corolla-tube three times as long, glandular and subpubescent, the lobes ovate, minutely pubescent, glandular-dotted.

Staminodes similar but more elliptic. Lip short, oblong, cuneate, widely retuse, the terminal points obtuse. Filament fairly stout. Anther-spurs 4, triangular, acuminate, equal.

LUZON, Province of Cavite, Mendez Nuñez, *Bur. Sci.* 1455 *Mangubat*; Maragondong, *Merrill* 4168: Province of Rizal, San Mateo, *For. Bur.* 1846, 3259 *Ahern's collector*; Bosoboso, *Merrill* 2844: Province of Pampanga, Mount Arayat, (*Warburg* 14069, fide Schumann sub *G. heterobractea*), *Merrill* 4232: Province of Laguna, Jalajala, (*Meyen*, fide Schumann sub *G. ectobolus*): near Manila, (*Barthe*, fide Gagnepain sub *G. Barthei*): Province of Pangasinan, *Merrill* 2874. PANAY, San Jose, *Yoder* 14.

Amboina, Celebes, Batchian, New Guinea and the Bismarck Archipelago; also as a weed of cultivation in Penang, Singapore and Java.

It is quite impossible to break up this species into the various "species" founded by Schumann and Gagnepain. I can not find a reliable character in any of the Philippine plants that I have seen, which justifies separating specifically any of the forms. *G. ectobolus* Schum. has for its chief character the production of bulbils in the axils of the stem leaves, a character which I have also seen in typical *G. marantina* introduced by Javanese from Java into Penang. *G. Barthei* Gagnepain, which I take to be the typical Philippine form, has broader leaves and a stouter stem than has the form that occurs occasionally as a weed in the Straits Settlements.

There is a considerable degree of variability in the pubescence of the various parts of the specimens. In some, at least, short processes arise on the corolla-tube and lobes, hardly long enough to be called pubescence. I have long ago pointed out the valueless character of the production or nonproduction of bulbils, for I have hardly met with any *Globba* in any abundance which does not occasionally produce them. *G. marantina*, which was for many years a weed in the Botanic Gardens in Singapore, and of which Schumann says that he had never seen flowers, eventually produced a few flowers, although almost every plant produced bulbils only for a number of years. Probably *G. strobilifera* Zoll. (*G. Zollingeri* Gagnep.) of Java is the same species.

10. *G. ustulata* Gagnepain in *Bull. Soc. Bot. France* IV 1 (1901) 208, *pl.* 7, *f.* 5-7; K. Schum. in *Pflanzenreich* l. c. 158.

An herb 40 cm tall, with ciliate sheaths. Leaves lanceolate, acuminate, petioled, slightly pilose, velvety beneath, ciliolate, 15 cm long, 4 cm wide; ligule 1.5 to 2 mm long, the margins villous. Panicle sessile, dense, 5 cm long. Bracts orbicular or elliptic, 1.2 cm long, black at the tips, bulbiliferous. Flowers two or three together on a short peduncle, black or purple. Ovary smooth, glabrous. Calyx 7 mm long, 3-toothed, the teeth mucronate. Corolla-tube 1.2 to 1.4 cm long, upper lobe with a long mucro 1 mm long. Anther 4-spurred, spurs acuminate.

BUSUANGA, Calamianes Islands, (*Marche* 227B), in Herb. Mus. Paris.

Indo-China.

I should reduce this species also to *G. marantina* L. from the description, for I have seen no specimens, were it not for the statement that the flowers are black or purple, a most unusual, if not unique character in the genus, and for the mucronate upper petal.

2. **HEDYCHIUM** Koenig.

Terrestrial or epiphytic herbs. Stems elongate, leafy. Leaves oblong or lanceolate. Inflorescence a terminal spike. Bracts oblong or lanceolate, subcoriaceous. Flowers one or more to each bract, showy. Calyx tubular, 3-toothed. Corolla-tube long, slender, the lobes linear, spreading or reflexed. Staminalodes linear. Filament long, slender; connective not prolonged. Lip large, bifid. Ovary 3-celled, many-ovuled. Style long, filiform; stigma small. Capsule globose or oblong, 3-valved. Seeds many, small, with a colored aril.

Species about 40, Indo-Malayan.

Terrestrial; flowers large, white..... 1. *H. coronarium*
Epiphytic; flowers red 2. *H. philippinense*

1. *H. coronarium* Koen. in Retz. Obs. 3 (1783) 73; Rose. in Trans. Linn. Soc. 8 (1807) 343, t. 20, f. 6; Monandr. Pl. (1828) t. 51; Sims in Bot. Mag. t. 708; Smith Exot. Bot. 2 (1805) t. 107; Wight Icon. t. 2010; Horan. Monogr. (1862) 24; Baker in Hook. f. Fl. Brit. Ind. 6 (1892) 225; K. Schum. in Pflanzenreich 20 (1904) 44.

H. gandasulium, *H. prophetae* & *H. album* Ham. ex Wall. in Hook. Kew Journ. Bot. 5 (1853) 325.

H. lingulatum Hassk. Pl. Jav. Rar. (1848) 135; Horan. Monogr. (1862) 25.

Stems 1 to 2 m tall. Leaves oblong-lanceolate to lanceolate, acuminate, base acute, the upper surface glabrous, the lower pubescent or glabrous, 8 to 60 cm long, 3 to 11 cm wide; ligule 2 to 3 cm long, membranous, obtuse. Spike ellipsoid, 5 to 12 cm long, 4 to 8 cm thick. Bracts ovate, obtuse, green with a pale margin, 2- or 3-flowered, 4 to 5.5 cm long, 2 to 3 cm wide. Ovary silky, 5 mm long. Calyx tubular, cleft on one side, 4 cm long. Corolla white, the tube cylindric, 8 cm long, the lobes narrow, lanceolate. Lip obcordate or obovate, more or less deeply bilobed, white with a yellow median line. Staminalodes broad, oblong-lanceolate, blunt, 4 cm long. Stamen shorter than or equaling the lip, 3.5 cm long, white; anther 12 mm long. Capsule oblong. Seed angled, with a lacerate aril.

SAMAR, Catubig, Merrill 5226. MINDANAO, Lake Lanao, Camp Keithley, Mrs. Clemens 77.

Probably a native of the Himalayan region but now spread as an alien or garden escape over most of the tropics.

2. *H. philippinense* K. Schum. in Pflanzenreich 1. c. 47.

An epiphytic herb 0.5 to 1 m tall. Stems solitary or two or three in a cluster. Leaves lanceolate, petiolate, 23 to 45 cm long, 7 to 8 cm wide, glabrous, the apex acute, the base narrowed to the petiole, pale beneath; petiole about 2 cm long; ligule large, membranous, acute. Spike subterminal, cylindric, nearly sessile, 9 cm long, 2 cm thick. Bracts elliptic or lanceolate, subacute or obtuse, coriaceous, punctate, ribbed, closely imbricate, 1 to 1.5 cm wide, pubescent at the apex, the margins scarious. Bracteoles tubular, split on one side, pubescent. Flowers in threes, yellow. Ovary glabrous. Calyx tubular, slender, 4 to 6

cm long, pubescent, split on one side. Corolla-tube slender, twice as long as the calyx, the lobes linear, 3 cm long. Staminodes wider, linear-ob lanceolate. Lip obovate, bilobed, 2 cm long, glandular-dotted, the margins crisped. Stamen as long as the lip. Capsule triquetrous, 3 cm long, orange-yellow. Seeds dark-red, elliptic, 5 mm long, ribbed, the aril fibrillose, red.

SULU ARCHIPELAGO, (*Vidal 3924*). MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 747*. LUZON, Province of Tayabas, Lucban, *Elmer 7909*.

Allied to *H. borneense* Ridl. Endemic.

3. KAEMPFERIA Linn.

Small herbs with tuberous aromatic rhizomes, the stems short. Leaves ovate or lanceolate. Inflorescence spicate, very shortly peduncled, with a few lanceolate bracts. Flowers fugacious, thin-textured, produced singly, white or violet. Calyx short, cylindric. Corolla-tube slender, the lobes narrow, linear. Staminodes very large, rounded, clawed, spreading. Lip similar, bilobed. Stamen thin, flat, not exerted; anther narrow, crested. Capsule oblong, thin-walled.

Species about 20, Indian and Siamese, one or two Malayan.

1. *K. galanga* Linn. Sp. Pl. (1753) 2; Hort. Cliff. 2 (1837) t. 3; Blume Enum. Pl. Jav. (1827) 47; Rosc. Monandr. Pl. (1828) t. 92; Roxb. As. Research. 11 (1810) 327; Fl. Ind. 1 (1820) 15; Wight. Icon. (1844) t. 899; Horan. Monog. (1862) 2; Baker in Hook. f. Brit. Ind. 6 (1890) 219; K. Schum. in Pflanzenreich 20 (1904) 77.

K. sessilis Koenig in Retz. Obs. 3 (1783) 67.

K. humilis Salisb. Prodr. (1796) 6.

K. plantaginifolia Salisb. in Trans. Hort. Soc. 1 (1812) 286.

Stemless, with a tuberous rhizome. Leaves two, horizontal, orbicular, subacute, the base rounded, 7 to 13 cm long, 4 to 9 cm wide. Flowers 6 to 12, fragrant, white. Bracts short, lanceolate, green. Calyx short. Corolla-tube 2.5 cm long, the lobes lanceolate. Staminodes cuneate, obovate, 1.2 cm long. Lip 2.5 cm long and nearly as wide, bilobed, the base spotted, violet, the rest white. Stamen thin, the crest quadrate, bilobed.

LUZON, Province of Rizal, Bosoboso, *Bur. Sci. 1181, 4560 Ramos*: Province of Cagayan, (*Cuming 1331*): Province of Tayabas, near Lucban, *Elmer 7408*. Native names, *Cusol*, *Guisol*, *Dusol*, *Dusog*.

A commonly cultivated plant of Indian origin, occurring all over the East as a garden escape.

4. GASTROCHILUS Wallich.

Low herbs with a creeping aromatic rhizome, the stems short or none. Leaves lanceolate or ovate, petioled, solitary or in tufts of from two to four. Spike axillary, central, or from the rhizome. Bracts large or of moderate size, thin. Flowers thin, opening singly, white, yellow, or red. Calyx tubular, spathaceous. Corolla-tube long, slender, the lobes oblong or lanceolate. Staminodes similar, petaloid. Lip oblong or obovate, saccate or convolute, entire or more or less lobed at the apex.

Stamen-filament thick, fleshy. Anther oblong, crest small, sometimes absent.

Species about 30, Indo-Malayan or Siamese.

***G. longipetiolata* sp. nov.**

Rhizome not seen. Leaves two, elongate, linear-lanceolate, obtuse, thin, glabrous on the upper surface, beneath sparingly pubescent, 14 cm long, 2 cm wide, the keel elevated at the rounded base; petiole 5 to 9 cm long. Spike central, 4 cm long, subcylindric. Bracts lanceolate, acuminate, pubescent especially on the edges. Calyx spathaceous, short. Corolla-tube slender, 4 cm long, the lobes lanceolate, acute, 8 mm long. Lip a little longer, obovate, the margins crisped. Stamen half as long; anther linear, the crest long, oblong, apex rounded, ovate.

MINDANAO, District of Zamboanga, Port Banga, *For. Bur.* 9110 Whitford & Hutchinson.

The first representative of the genus recorded from the Philippines, only one specimen with a single flower seen. It belongs to the section *Mesantha*, and is allied to *G. longipes* King & Prain.

Species of this genus are comparatively seldom met with in flower in forests owing to the fugacity of their flowers, and these plants are seldom obtained by collectors of herbarium specimens. There are probably more species in the Philippines, but the only way to obtain satisfactory material is to bring in the living plants and cultivate them.

5. CURCUMA Linn.

Herbs with aromatic rhizomes and tuberous or fibrous roots. Leaves oblong or obovate, usually tufted, rarely solitary. Spikes peduncled, from the rhizome, with the leaves or not. Bracts persistent, forming a cone, usually brightly colored, the uppermost ones often empty, longer and of a different color. Flowers several in each bract, with several bracteoles, short-lived. Calyx short, cylindric, toothed. Corolla-tube broad, funnel-shaped, the lobes ovate or oblong. Stamen oblong, petaloid. Lip orbicular or obovate. Filament of stamen short, broad. Anther-cells parallel, sometimes spurred at the base, crested or not. Style filiform. Ovary 3-celled, many-ovuled. Capsule membranous, globose, 3-valved. Seeds arillate, ovoid or oblong.

Species about 35, India to Siam, Malaya, and Australia.

The greater part of the genus is Indian and Burmese, and of these species several have been widely distributed in the East in cultivation, and have there occasionally established themselves in and near villages, or persisted long after the villages have disappeared. Such are the species occurring in the Philippines.

1. ***C. Zedoaria*** Rose. Monandr. Pl. (1828) *t.* 109; Horan. Monog. (1862) 23; Baker in Hook. f. Fl. Brit. Ind. 6 (1890) 210; K. Schum. Pflanzenreich 20 (1904) 110; Ridl. Mater. Fl. Malay. Penin. 2 (1907) 21.

C. Zerumbet Roxb. Pl. Coromandel 2 (1798) *t.* 101; As. Research. 11 (1810) 333; Fl. Ind. 1 (1820) 23.

C. longiflora Salisb. in Trans. Hort. Soc. 1 (1812) 285.

C. speciosa Link Enum. 1 (1821) 3.

Amomum Zerumbeth Koenig in Retz. Obs. 2 (1783) 55.

A. latifolium Lam. Encycl. 1 (1783) 134.

Rhizome large, fleshy, with oblong rounded tubers, orange-colored inside. Leaves in pairs, lanceolate, cuspidate, glabrous, thin, bright green, with usually a central purple-brown bar, 25 to 60 cm long, 8 to 15 cm wide. Scape from the rhizome, not from the leaf-tuft, often appearing without the leaves, the peduncle 15 cm long, the spike as long as the peduncle, of about 20 bracts, the lower ones green, more or less tipped with pink, the upper ones lanceolate, deep-crimson. Flowers four to each bract. Bracteoles thin, transparent, 2 cm long, lanceolate. Calyx small, bifid, hairy. Corolla-tube 2 cm long, funnel-shaped, yellowish-white, the lobes 1 cm long. Staminodes oblong, obtuse, erect. Lip oblong-obovate, bilobed, yellowish. Stamen-filament adnate to the staminodes, short, broad. Anther spurred. Capsule ovoid, trigonous, straw-colored, dehiscing irregularly. Seeds ellipsoid, the aril white, lacerate.

LUZON, Province of Rizal, Antipolo, *For. Bur.* 7046 *Curran*; Malapadnabato, *Merrill* 2713; Province of Bataan, Lamao River, *Whitford* 1267, *Leiberg* 6142; Province of Benguet, Sablan, *Elmer* 6170; Province of Zambales, *For. Bur.* 6924 *Curran*; Province of Pampanga, *Bolster* 26. NEGROS, *For. Bur.* 11235 *Everett*. GUIMARAS, *Ritchie* 26. MINDORO, Pola, *Merrill* 2404; Mansalay, *Merrill* 908. MINDANAO, Lake Lanao, *Mrs. Clemens* 425.

The zedoary is said to be wild in the eastern Himalayas, and is now spread all over the tropics of the East, being cultivated for curry stuff and as medicine. It readily establishes itself and remains long after the disappearance of the garden in which it was formerly cultivated.

Mr. Ritchie gives the native name *Lampoyang* for it. This word is the Malay one for *Zingiber Cassumunar* and is wrongly affixed to the zedoary.

2. *C. longa* Linn. *Sp. Pl.* (1753) 2; Koenig in *Retz. Obs.* 3 (1783) 71; Roxb. *As. Research.* 11 (1810) 340; *Fl. Ind.* 1 (1820) 32; *Horan. Monog.* (1862) 23; *Lindl. Bot. Reg. t.* 88b; *Bentley & Trimen Med. Pl. t.* 269; *Baker in Hook. f. Fl. Brit. Ind.* 6 (1890) 214; *K. Schum. in Pflanzenreich* 1. c. 108.

C. domestica Lour. *Fl. Cochinch.* (1790) 10.

Amomum curcuma Jacq. *Hort. Vindob.* 3 (1776) t. 4.

Rhizome large, with elliptic or cylindric tubers, the interior deep-orange-red. Leaves 5 or 6, thin, lanceolate or oblong-elliptic, acuminate, cuspidate, glabrous, pale-green, 45 cm long, 12 to 18 cm wide; petiole channeled, 20 cm long. Spike 10 to 20 cm long, on a peduncle of about the same length. Bracts oblong to lanceolate, 2 to 3 cm long, spreading, recurved, pale-green, the terminal ones sometimes rosy. Calyx tubular, with three short points. Corolla-tube longer, the lobes oblong, obtuse, creamy-white. Lip oblong, the sides curved upward and the tip deflexed, apex truncate, white with a deep-yellow central bar. Staminodes as long as the petals. Stamen-filament broad; anther small, ovate, with two rather long decurved horn-like processes, the connective not prolonged.

PALAWAN, *For. Bur.* 7457 *Curran*, near the seashore.

The turmeric is a native of India, and here is obviously an escape from cultivation.

6. ZINGIBER Adans.

Herbs with short, thick, more or less aromatic rhizomes. Stems leafy, the leaves lanceolate or elliptic. Spike from the rhizome, rarely on the leafy stem, sessile or usually peduncled, cylindric, conic, or fusiform, with large, dense, yellow, red, or green bracts inclosing one or more flowers. Calyx tubular, three-lobed, short. Corolla-tube rather longer than the bract, with oblong or lanceolate lobes, usually white, or creamy, sometimes marbled black. Staminodes wanting. Lip 3-lobed, median lobe longer. Stamen-filament linear; anther-cells linear, the connective prolonged into a long curved beak. Style as long. Capsule thin-walled, splitting into three valves. Seed black, angled, arillate.

Species about 30, Indo-Malaya to northern Australia.

There are two or three species, perhaps more, in the material submitted, too incomplete to describe. These plants have the spikes so full of water that they require the flowers to be separately dried, or they quickly rot.

Spikes terminal on the leafy stem; bracts narrow, oblong..... 1. *Z. mollis*
Spikes radical.

Spikes glabrous, cylindric, blunt 2. *Z. Zerumbet*

Spikes pubescent, acute 3. *Z. pubisquama*

1. *Z. mollis* sp. nov.

Stems solitary, slender, about 60 cm tall, the rhizome short. Leaves narrowly lanceolate, 12 to 15 cm long, 2 cm wide, acuminate, caudate, narrowed at the base, not petioled, the upper surface glabrous, beneath sprinkled with white hairs; ligule papery, rounded, entire, glabrous; sheath sparingly hairy. Spike terminal, cylindric, 6 cm long. Bracts yellow, narrowly oblong, apex rounded, 2 cm long and nearly 1 cm wide at the base. Bracteoles narrower, oblong, glandular-dotted on the edge. Ovary glabrous. Calyx thinly spathaceous, tubular, bifid into two lanceolate lobes, 2 cm long. Corolla-tube cylindric, 2.5 cm long, the lobes lanceolate, acuminate, acute, 1.5 cm long. Lip trilobed, rather large, the lateral lobes nearly as long as the middle one, which is entire and blunt. Stamen-connective beak-like, slender, curved. Capsule oblong, red, dehiscent, yellow inside. Seeds black.

LUZON, Province of Benguet, Baguio, *For. Bur.* 4886, 4914 Curran; Mount Tonglon, *Merrill* 4843: Province of Pampanga, Mount Abu, *Bur. Sci.* 1985 Foxworthy, altitude 1,330 m. NEGROS, *Elmer* 9843.

var. β . Leaves more elliptic in outline; ligule and sheath densely pubescent. Spike on a leafless peduncle from the rhizome. Peduncle 10 to 15 cm long, with distant tubular sheaths.

LUZON, Province of Tayabas, Mount Banajao, *Elmer* 8133: Province of Pampanga, Mount Abu, *Bur. Sci.* 1991 Foxworthy. One of the rarest gingers in this locality, growing in loose soil in shaded ravines at 700 meters, inflorescence red (*Elmer*); forested slopes in ravines at 1,360 meters (*Foxworthy*).

This ginger seems to be allied to *Z. officinale* as much as to any other species, and like it has the spike sometimes borne on the top of the leafy stem and also on the rhizome like the majority of the species of the genus.

2. **Z. Zerumbet** Sm. Exot. Bot. 2 (1804) 103, t. 112; Roscoe in Trans. Linn. Soc. 6 (1807) 348; Monandr. Pl. (1828) t. 84; Horan. Monogr. (1862) 27; Bot. Mag. t. 2000; Wight Icon. (1853) t. 2002; Baker in Hook. f. Fl. Brit. Ind. 6 (1890) 247; Ridl. Mater. Fl. Malay. Penin. 2 (1907) 27; K. Schum. in Pflanzenreich 20 (1904) 172.

Z. Blancoi Hassk. in Flora 47 (1864) 20.

Z. amaricans Blume Enum. Pl. Jav. 1 (1827) 43.

Z. spurium Koen. in Retz. Obs. 3 (1783) 60.

Z. ovoideum Blume l. c. 43.

Z. truncatum Stokes Bot. Mat. Med. 1 (1848) 68e.

Amomum Zerumbet Linn. Sp. Pl. (1753) 1; Jacq. Hort. Vindob. 3 (1776) t. 54.

A. spurium Gmel. Syst. 2 (1792) 6.

A. sylvestre Poir. in Lam. Encycl. Suppl. 5 (1817) 548.

Zerumbet zingiber Lestib. Ann. Sci. Nat. II 15 (1891) 329.

Amomum zingiber Naves in Blanco Fl. Filip. ed. 3, pl. 131, non Linn.

Rhizome thick, yellow, becoming white inside. Stems fairly stout, 30 to 45 cm tall. Leaves lanceolate, broad, glabrous except along the midrib which is hairy, 12 to 15 cm long, 5 to 7 cm wide; ligule papery, brown, 1 cm long. Spikes globose at first, becoming cylindric, blunt, as long or longer than the peduncle. Bracts broad, rounded, green turning red, the edges paler, hairy. Calyx spathaceous, 1 cm long, white. Corolla-tube twice as long, the lobes lanceolate, acute, white. Lip broad and short, the lateral lobes rounded, the middle one orbicular to ovate, retuse, pale-yellow and with an orange bar or faintly mottled with pink.

LUZON, Province of Bataan, Lamao River, Whitford 1364, Leiberg 6089, Elmer 7028; Province of Cavite, Bur. Sci. 1454 Mangubat; Manila, Merrill 3440. MINDANAO, Lake Lanao, Camp Keithley, Mrs. Clemens. Native names *Lumbong usa*; *Layang usa*; *Lampuyang*.

This is a widely distributed village plant all over the eastern islands; its original home seems to be unknown.

3. **Z. pubisquama** sp. nov.

Leafy stem tall and stout, 1 cm thick. Leaves narrowly lanceolate, acuminate, acute, the upper surface glabrous, finely ribbed, the back glabrous except the ribbed keel which is covered with pale hairs, 22 cm long, 3 to 4 cm wide; ligule very short, oblong, the edges ciliate; sheaths nearly glabrous. Inflorescence elongate, cylindric, acute, 14 to 15 cm long, 4 cm thick, on a stout peduncle 16 cm long, covered laxly with oblong sheaths 5 cm long, hairy, apex truncate. Bracts narrowly oblong, blunt, 3 cm long, 1.5 cm wide, closely appressed, hairy; inner bract linear-oblong, tip rounded, hairy, 3 cm long, 1 cm wide; floral bract thin, papery. Calyx thin, tubular, apex 3-lobed, 1.5 cm long. Corolla-tube slender, 3 cm long, glabrous, the lobes oblong, acute, hooded at the tip, 1 cm long, 3 mm wide. Lip broad, more fleshy. Anther narrowly oblong, the connective-beak 6 mm long. Style a little longer, cup-shaped.

MINDANAO, Lake Lanao, Camp Keithley, Mrs. Clemens 1163a.

Allied to *Z. Cassumunar* Roxb.

INCOMPLETE SPECIES.

4. *Z.* sp.

Leaves not seen. Spike stout, 30 cm long, 6 cm wide, cylindric, obtuse, the peduncle 7 cm long, covered with lax sheaths. Bracts large, oblong, narrowed a little at the base, the upper margin truncate, rounded, involute, 4 cm long, 2 cm wide, finely ribbed, glabrous. Bracteole tubular, spathaceous, the limb lanceolate, hairy, 4 cm long. Calyx thin, glabrous, tubular, apex rounded. Corolla-tube 2 cm long, the lobes as long, lanceolate, acute. Connective of the anther 1 cm long, grooved.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens*.

A fine species, allied to *Z. spectabile* Griff. Unfortunately no leaves were collected, nor was any description given of the habit or color, and I had only one poorly preserved flower to examine. The specimen is therefore insufficient for a proper description.

5. *Z.* sp.

Stem 2.4 m tall. Leaves lanceolate, petioled, the base narrowed gradually to the petiole, apex acute, 38 cm long, 7 cm wide, the petiole 2 cm long, glabrous; ligule large, 1 cm long, rounded. Spike subterminal on the leafy stem, deflexed, cylindric, 8 cm long, 3 cm thick. Bracts obovate, rounded, white, 1 cm wide, glabrous except for a few hairs on the edges, strongly ribbed.

LUZON, Province of Benguet, Sablan, *Elmer 6255*, very rare, on precipitous slopes in deeply shaded ravines.

There are no flowers on the specimen, which is therefore unidentifiable, but it is very distinct from any other Philippine species.

7. *AMOMUM* L.

Rhizome usually long. Leafy stems tall. Leaves lanceolate, oblong, or linear. Inflorescence obconic, or elongate, on a short peduncle from the rhizome. Bracts lanceolate or ovate, containing one or more flowers inclosed in thin bracteoles. Calyx as long as the corolla-tube. Corolla-lobes oblong or lanceolate. Staminodes absent or small. Lip large often convolute. Stamen broad, crest rounded, entire, or usually 3-lobed. Style shorter. Capsule globose or oblong, sometimes covered with short processes. Seeds numerous.

Species numerous, African and Indo-Malayan.

Anthers crested.

Inflorescence elongate, slender 1. *A. fusiforme*

Inflorescence obconic, thick.

Anther-crest entire 2. *A. Warburgii*

Anther-crest 3-lobed.

Staminodes absent 3. *A. Loheri*

Staminodes present.

Lip entire.

Leaves broad 4. *A. propinquum*

Leaves narrow 5. *A. elegans*

Lip 3-lobed.

Middle lobe entire 6. *A. deuteramomum*

Middle lobe bifid 7. *A. trilobum*

Anthers crestless 8. *A. lepicipum*

1. *A. fusiforme* sp. nov.

Stem 1.5 m tall. Leaves narrowly elliptic, acuminate, cuspidate, the upper surface glabrous, beneath minutely velvety-pubescent, pale, glaucous on the lower surface, 30 cm long, 9 cm wide; petiole 1 cm long; ligule oblong, truncate, pubescent; sheath glabrous, ribbed. Spike basal, prostrate, slender, 15 to 45 cm long, the base with short ovate bracts. Flowers in pairs, in distant bracts which are hardly imbricate. Bracts linear-oblong, 5 cm long, ribbed and dotted between the ribs, obtuse. Bracteole spathaceous, 3 cm long, split on one side, and with two ciliate points. Calyx tubular, hairy, 3 cm long; lobes lanceolate. Corolla-tube short, lobes long, lanceolate, hooded at the tip. Lip bifid, with linear obtuse lobes, elongate but shorter than the stamen and adnate to the side of the filament. Filament short, thick, strongly winged. Anther 6 mm long, linear, hairy. Crest long, oblong, shortly trilobed at the base. Style as long as the anther-cells. Stigma triangular, hairy. Ovary elongate. Fruit fusiform, glabrous, ribbed, 4 cm long, 7 mm thick, terminated by the hairy 1 cm long style.

MINDANAO, Surigao, Biga Creek, *Bolster* 331, 224, in forests 150 to 350 ft. alt., flower yellow, or yellowish-white, native name "*Loya-loya*." NEGROS, *Elmer* 9509.

Apparently allied to the genus *Geocharis*, but I am not sure about the lip for what I take to be the lip looks more like staminodes. Altogether a very curious plant which may prove to be the type of a new genus, here provisionally placed under *Amomum*.

2. *A. Warburgii* K. Schum. *Pflanzenreich* 20 (1904) 257.

Costus Warburgii K. Schum. in *Engl. Bot. Jahrb.* 27 (1899) 246.

Leaves oblong-lanceolate, attenuate-acuminate, the base narrowed but rounded and suboblique, glabrous on the upper surface except at the extreme base, subtomentose beneath, the midrib pilose, coriaceous, 20 to 25 cm long, 5 to 7 cm wide; ligule short, truncate, hardly 1 mm long; petiole subtomentose, about 1 mm long. Spike dense, short-peduncled. Bracts lanceolate, acute, subsilky, 1 to 8 cm long. Bracteoles tubular, silky, 2-toothed. Ovary silky. Calyx 4 cm long, deeply cleft on one side and with three subulate lobes. Corolla-tube one-third shorter than the calyx, the lobes spathulate, obtuse, 2 cm long. Lip obovate, 1.6 cm long. Filament oblong. Connective-crest truncate, a little wider than the anther, tomentose.

Southern Mindanao, (*Warburg*).

Endemic.

3. *A. Loheri* K. Schum. l. c. 247.

A fairly tall plant. Stems 5 mm in diameter. Leaves linear-lanceolate, attenuate-acuminate, the base narrowed, glabrous, 30 to 35 cm long, 3 to 4 cm wide; petiole 1 to 3 mm long; ligule 5 mm long, truncate, coriaceous. Spike ellipsoid, 3 to 5 cm long, the peduncle as long as the spike, white-pubescent, with a few ovate, glabrous, 0.8 to 1.2 cm long bracts, the outer ones soon disappearing. Bracteoles tubular, 2-lobed,

pilose. Flowers pedicelled, the pedicel 2 mm long. Ovary silky. Calyx tubular, 2-lobed, one lobe 2-toothed, minutely pubescent, 2 cm long. Corolla-tube hardly longer than the calyx, the lobes 2 cm long. Lip obovate, entire, 3 cm long. Stamines none. Filament linear. Anther-cells pubescent. Connective-crest three-lobed.

LUZON, (*Loher* 675).

This endemic species, in habit and in many other characters, resembles *A. trilobum*, but differs, according to the description, by its entire lip and the absence of stamines.

4. *A. propinquum* Ridl. in Govt. Lab. Publ. (Philip.) 35 (1905) 84.

Stems stout, about 2 m tall. Leaves oblong-lanceolate, acuminate, cuspidate, 32 cm long, 8 cm wide, glabrous, drying dark, paler beneath, the petiole very short; ligule oblong, truncate, 5 mm long. Capitulum obconic, on a 7 cm long peduncle. Floral bracts ovate-lanceolate, pubescent. Bracteole tubular, 1 cm long, pubescent, trifid, two lobes connate nearly to the tip. Calyx-tube 1 cm long, glabrous, trifid, the lobes mucronate, keeled, setulose. Corolla-tube trumpet-shaped, pubescent, the lobes oblong, obtuse, rounded, 1 cm long, yellow marked with red. Lip obovate, 2 cm wide, the central bar elevate-papillose. Anther oblong, the edges setose, the crest 3-lobed, upper lobe rounded, the lateral ones large, recurved, broadly oblong, obtuse. Filament thin, broadly linear. Stamines very short, subulate. Fruit subglobose or elliptic, red, covered with short simple or forked processes.

LUZON, Province of Benguet, Baguio, *Elmer* 6284, *For. Bur.* 5098 *Curran*; Bugias, *Merrill* 4656: Province of Cavite, *For. Bur.* 7682 *Curran*: Province of Laguna, Mount Banajao, *For. Bur.* 8030 *Curran & Merritt*: Province of Tayabas, *For. Bur.* 7828 *Curran & Merritt*. MINDANAO, District of Davao, Todaya, *Copeland* 1293. MASBATE, *For. Bur.* 1704 *Clark*.

Native name *Tugis*, the fruit eaten. Endemic.

This species is allied to *Amomum flavum* Ridl. of the Malay Peninsula. Nearly all the specimens cited above have no leaf specimens with them, but on two or three distribution numbers fragments of *Hornstedtia philippinensis* were mixed with the *Amomum*, so much so that, abnormal as it appeared, I referred the fruit of the *Amomum* to the *Hornstedtia*. A better series of specimens showed that this was an error.

5. *A. elegans* Ridl. l. c. 84.

Rhizome long, slender, covered with brown papery sheaths 1 cm long. Stems slender, distant, 60 cm tall. Leaves narrowly linear-lanceolate, cuspidate, 15 to 20 cm long, 1 to 1.5 cm wide, the upper surface glabrous, beneath silky-hairy, shortly petioled; ligule small, truncate, the petiole, sheath and ligule hairy. Inflorescence obconic, 1 cm long, nearly sessile or distinctly stalked, on long stolons, covered with oblong-ovate, truncate sheaths. Bracts oblong, obtuse, pubescent, with about 10 elevated nerves. Bracteole tubular, silky-hairy. Calyx tubular, silky-hairy, 1 cm long, 2-lobed, the lobes lanceolate, acuminate, silky, as long

as the tube. Corolla yellow or white, the tube as long as the calyx, pubescent, the lobes linear-oblong, obtuse, glabrous, 1.5 cm long. Staminalodes subulate. Lip 2 cm long, the base narrowed, the limb broad, obovate, rounded, entire. Stamen-filament slender. Anther narrowly oblong, the crest trifid, central lobe small, oblong, the lateral ones from the upper angle of the anther, longer, linear, curved. Ovary silky-hairy.

LUZON, Province of Bataan, Mount Mariveles, *For. Bur.* 3303 Borden, Whitford 207, 300.

6. *A. deuteramomum* K. Schum. in *Engl. Bot. Jahrb.* 27 (1899) 313; *Pflanzenreich* l. c. 237.

Leaves shortly petioled, linear-lanceolate, attenuate-acuminate, narrowed at the base, quite glabrous, 30 cm long, 3.5 cm wide; ligule hardly 5 mm long, obtuse, glabrous. Flowering stem 12 cm long. Spike ellipsoid, 8 cm long, the peduncle covered with ovate, obtuse, glabrous sheaths. Outer bracts ovate, acute, glabrous, pale straw-colored, 3 cm long. Bracteoles 1.5 cm long, tubular, glabrous, 3-toothed. Ovary pilose at the top. Calyx 1.3 cm long, tubular, 3-toothed, glabrous. Corolla-tube 10 mm long, the lobes obtuse, 8 mm long. Lip subovate, clawed, the apex 3-lobed, 10 mm long, the median portion callose and puberulous. Filament concave, 5 mm long. Anther shorter. Crest 3-lobed, 3 mm long. Stylodes 2, subulate.

MINDANAO, in forests near Bujong, (*Warburg* 15735).

Endemic.

Allied to *A. cardamon* Linn.

7. *A. trilobum* Ridl. l. c. 85.

Rhizome slender, long, covered with loose sheaths. Stems fairly stout, 1 to 2.5 m tall. Leaves narrowly lanceolate, caudate-acuminate, the base narrowed to the petiole, 20 cm long, 3 cm wide, glabrous; petiole 5 mm long; sheaths narrow, the edge and the short, bifid ligule silky-pubescent. Inflorescence on long creeping stolons, covered with sheaths, obconic, 2 cm long, on a 1 cm long peduncle. Bracts ovate, obtuse, ribbed, glabrous. Calyx tubular, pubescent, the lobes 3, oblong, rounded. Corolla-tube as long as the calyx-tube, 1 cm long, the lobes oblong-linear, obtuse. Staminalodes linear, obtuse, fleshy. Lip obovate, rounded, 1 cm long, white with a central yellow bar, the tip undulate, 3-lobed, the lateral lobes rounded, the middle one bifid, narrowed. Stamen-filament linear, fleshy, grooved. Anther linear, glabrous. Crest 3-lobed, the middle one flat, quadrate, oblong, retuse, the two side arms linear, subacute, curved.

LUZON, Province of Pampanga, Mount Arayat, *Bolster* 67; Province of Bulacan, *For. Bur.* 7218 Curran; Province of Rizal, Bosoboso, *Bur. Sci.* 4655 Ramos.

On shaded slopes; flowers fragrant.

Endemic.

8. *A. lepicarpum* Ridl. in Elm. Leaf. Philip. Bot. 2 (1909) 604.

Stems 3 to 5 m tall, 3 cm in diameter at the bulbous base. Leaves about 12 to 14 cm apart, coriaceous, dark-olive-green, polished above, paler beneath, linear-oblong, base rounded, apex acute, 60 cm long, 10 cm wide, quite glabrous; petiole 2 cm long, channeled above, the back rounded; ligule 1 cm long, oblong, truncate. Inflorescence radical, on a 9 cm long peduncle, with rather distant, lanceolate, bracts. Bracts narrowly lanceolate, acuminate, ribbed, glabrous. Bracteoles narrowly lanceolate, acuminate, ribbed, 2.5 cm long, 4 mm wide, inner bracteole shorter, strongly ribbed, pungent-mucronate, all glabrous. Ovary sparingly pubescent. Calyx tubular, with three, lanceolate, mucronate-pungent lobes, the tube pubescent, 2 cm long. Corolla-tube a little longer, hairy, lobes linear-oblong, obtuse, 7 mm long. Lip entire, horizontal, linear, gradually dilated at the tip into a rounded, emarginate limb, 1 cm long, 5 mm wide. Anther linear-oblong, apex retuse, crestless. Inflorescence ovoid or subglobose, 8 cm long and about 6 cm thick. Fruit globose, reddish, 1.5 cm long, ferruginous-tomentose, with short, erect, scattered, warty processes at the tip, the calyx-tube long-persistent.

NEGROS, Cuernos Mountains, near Dumaguete, *Elmer 10044*, in wooded ravines on the edge of the river at an altitude of about 830 m. The form of the flowers is like that of a *Hornstedtia*, but the inflorescence, fruit, and bracts that of an *Amomum*.

Endemic.

A. lepicarpum var. *pubescens* Ridl. l. c. 605.

Leaves larger and more narrowed to the base, their margins distinctly undulate; sheaths and petioles pubescent. Bracts wider. Fruit more rufous-tomentose.

NEGROS, Cuernos Mountains, near Dumaguete, *Elmer 10384*, in moist fertile soil of dense shrubberies at an altitude of about 1,050 m; it may be a distinct species, but is very closely allied to the type. The flowers are in a bad state for dissection.

8. *HORNSTEDTIA* Retz.

Tall plants with a stout rhizome. Leaves oblong. Spikes peduncled, from the rhizome, subcylindric or obconic. Outer bracts large, usually red, ovate to oblong, forming a cup. Bracteoles thin, tubular. Flowers numerous, sessile, red. Calyx spathaceous, thin. Corolla-tube long, the lobes narrow, connivent. Lip narrow, linear-oblong, often much longer, sides at the base erect, curved over the stamen. Staminodes none. Stamen thick, short. Anther thick, bent at an angle with the filament, crest small or none. Capsule oblong, with thin cartilaginous walls. Seeds numerous, black.

About 40 known species ranging from India through the Malay Peninsula and Archipelago to northern Australia, headquarters in the Malay Peninsula and Borneo. I here separate from this genus as laid down in my Materials for a Flora of the Malay Peninsula 2 (1907) 34, the genus *Nicolaia* or *Phaeomeria*, as Schumann does.

1. *H. philippinensis* Ridl. in Govt. Lab. Publ. (Philip.) 35 (1905) 86.

Stems 2 m tall and fairly thick. Leaves oblong-lanceolate, caudate, glabrous, narrowed at the base, pale beneath, 45 cm long, 3 to 6 cm wide; petiole 1 to 2 cm long; ligule bilobed, oblong, obtuse, 1 cm long. Inflorescence borne on a long rhizome-branch 15 cm long, covered with lanceolate acute sheaths. Spikes 4 to 6 cm long on peduncles covered with sheaths 2 to 8 cm long. Bracts thin, lanceolate, ribbed, hairy at the tip, the largest about 2 cm long. Flowers scarlet. Bracteole oblong-lanceolate, strongly nerved, the margins ciliate. Calyx tubular, with three acute lobes 3 cm long. Corolla-tube 4 cm long, slender, the lobes narrow, linear-oblong, obtuse, 1 cm long. Lip 4 cm long, fleshy, linear-oblong, the apex dilated, rounded, entire. Stamen crestless, 1 cm long, the apex retuse.

LUZON, Province of Tayabas, *For. Bur.* 11109 Curran. MINDORO, Bongabong River, *For. Bur.* 3737 Merritt. PALAWAN, *Bur. Sci.* 804 Foxworthy. NEGROS, *For. Bur.* 11203 Everett, *Elmer* 10270. MINDANAO, Lake Lanao, *Mrs. Clemens* 76: District of Davao, *Copeland* 416, *DeVore & Hoover* 111, *Williams* 2888: Province of Surigao, *Bolster* 221.

By some mistake in several of the sheets, the fruits of *Amomum propinquum* were distributed as the fruit of this plant, hence my error in describing the fruit in the original description. The fruit of this species has not yet been collected. It belongs to the group to which Griffith gave the generic name *Achasma*, being allied to *H. megalocheila* Ridl.

Endemic.

2. *H. conoidea* Ridl. in Elm. Leaf. Philip. Bot. 2 (1909) 605.

Stems clustered, 3 m high, 3 cm in diameter at the swollen base. Leaves oblong-lanceolate, shortly cuspidate, base very shortly rounded, narrowed, 45 to 55 cm long, 8 to 14 cm wide, glabrous on the upper surface, beneath sprinkled with silky hairs which are more abundant on the midrib and margins; petiole very short (1 cm on some parts of the stem), pubescent; ligule truncate, densely hairy; sheath reticulate, sparingly hairy above. Spike subsessile, red, ovoid-conic, 7 to 8 cm long. Bracts ovate to ovate-lanceolate, acute, rather softly coriaceous, red, finely ribbed, and white-silky at the base, 4 cm long, 1.5 cm wide. Flowers 7.5 cm long. Calyx red, tubular, silky-hairy at the base, becoming glabrous upward, 5 cm long, split on one side, the lobes acute, tipped with hairs. Corolla red, tube 7 cm long, slender, the lobes oblong, obtuse, 1.5 cm long, rather narrow, the lip entire, fleshy, 2 cm long, blunt, margins white, upcurved. Anther hairy, with a thin, rounded, short crest.

NEGROS, Cuernos Mountains, near Dumaguete, *Elmer* 10246, in fertile soil in damp ravines at an altitude of about 600 m. Native name *Tagbac*. MINDANAO, Lake Lanao, *Mrs. Clemens*, July, 1906. Closely allied to *Hornstedtia conica* Ridl., of the Malay Peninsula, differing in its pubescent ligule and petiole.

Endemic.

3. *H. microcheila* Ridl. l. c. 606.

Stems from 1 to 3 m tall, several in a somewhat scattered cluster, recurved or drooping, yellowish-green, rigid, less than 1.5 cm thick, except the reddish, very much enlarged bulbous bases. Leaves subcoriaceous, linear-oblong, cuspidate, 20 to 24 cm long, 5 cm wide, glabrous on the upper surface, the midrib pubescent beneath, margins glabrous, reddish-brown; petiole 1 cm long, puberulous; ligule oblong, rounded, half as long as the petiole; sheath pubescent above, reticulate. Inflorescence small, ovoid, 4 cm long, on a peduncle about as long, which is covered with ovate, ribbed, pubescent bracts. Inflorescence-bracts few, ovate, the largest 3 cm long, 1.5 cm wide, coriaceous, ribbed, pubescent, red, mucronulate, the margins thinner, ciliate. Ovary glabrous, with a tuft of silky hairs at the top. Calyx tubular, 4 cm long, with a few silky hairs at the base, glabrous above except for the two acuminate lobes which bear tufts of hairs. Corolla pink, the tube 5 cm long, the upper lobe ovate-oblong, obtuse, 7 mm long, the lower ones narrower, linear-oblong. Lip creamy-white, 1 cm long, with two short narrow lobes, as long as the anther, base narrow, the sides upcurved and terminated by a rounded crisped limb; disk at base sparingly silky-hairy. Anther very short, glabrous, retuse at the tip. Stigma large, club-shaped.

NEGROS, Cuernos Mountains, near Dumaguete, *Elmer 10279*, near the river at an altitude of about 900 m. The smallest-flowered species of the section, and remarkable for its white lip, which is unusual in the genus.

Endemic.

4. *H. lophophora* Ridl. l. c. 607.

Stems 6 m tall, 3 cm thick, the bulbous base 12 cm in diameter. Leaves lanceolate, oblong, slightly narrowed at the broad base, 69 cm long, 15 cm wide, glabrous on the upper surface, beneath silky-velvety, the midrib prominent, silky; petiole 2 cm long, but the blade decurrent to the base; ligule 1 cm long, covered with tufts of silky hairs, arranged in transverse lines. Sheath striate, with small, round or linear pustules, each bearing a tuft of silky hairs. Inflorescence clustered, scarlet, on peduncles 1 cm thick, covered with silky hairs. Spike 4 to 5 cm long, ovoid. Bracts ovate, acute, pungent, glabrous, red, longitudinally striate with rather high narrow ridges, with a line of pustules or transverse bars between each rib, the inner bracts lanceolate. Flowers not seen. Fruits glabrous, 2 cm long, flattened, elliptic, beaked, bearing the remains of the calyx, finely ribbed, thin-walled, with numerous oblong to pyriform seeds which are irregular in form, but usually truncate, 2 mm long.

NEGROS, Cuernos Mountains, near Dumaguete, *Elmer 10365*, in fertile glens at an altitude of about 1200 m.

As a rule it is not advisable to describe a *Hornstedtia* as new, without seeing the flowers, but an exception may be made in the case of this curious species. The peculiar sheath and ligule, as well as the small flattened fruit, is quite unique in the genus. In some of the islands of the Eastern Archipelago, species are found in which the leaf-sheaths are not only ribbed longitudinally, but also

have transverse bars at intervals, giving them a reticulated appearance. In the above species the transverse bars are sometimes reduced to round pustules bearing tufts of silky hairs, so that the sheaths appear spotted with white tufts; these tufts run into transverse lines on the ligule.

Endemic.

9. PHAEOMERIA Lindl.

Tall herbs with lanceolate leaves. Capitula obconic or globose on tall peduncles from the rhizome. Outer bracts large, usually spreading, involucral. Floral bracts linear-oblong, colored. Bracteoles tubular, spathaceous. Calyx bifid. Corolla erect, lobes lobate. Lip narrow, short. Stamen-filament linear. Anther oblong, crestless. Fruits obconic, the top rounded or flat, half-woody. Seeds numerous.

Species about 10, Indo-Malayan.

1. **P. imperialis** Lindl. Introd. Nat. Hist. ed. 2 (1836) 446.

Alpinia magnifica Rosc. Monandr. Pl. (1828) t. 75.

Nicolaia imperialis Horan. Monogr. (1862) 32, t. 1.

Hornstedtia imperialis Ridl. in Journ. Roy. As. Soc. Str. Branch 32 (1899) 148; Mat. Fl. Malay Penin. 1 (1907) 40.

Rhizome short and stout. Stems 4 m tall, 3 cm thick. Leaves oblong, acute, glabrous, 66 cm long, 18 cm wide; ligule ovate, blunt, nearly 3 cm long. Peduncle 1 m tall. Spikes cone-shaped, 12 cm long. Outer bracts ovate-oblong, spreading, 12 cm long, pink. Floral bracts pink-edged, white, linear-oblong. Calyx 1 cm long, deeply bifid. Corolla-tube 3 cm long, the lobes lobate, thin, obtuse, pink. Lip longer, oblong, obtuse, the sides convolute, pink-edged, white. Filament pubescent. Anther emarginate. Fruits obconic, green, hairy.

MINDANAO, District of Davao, *Williams* 2943.

Malay region; often cultivated and probably only so in the Philippines.

10. PLAGIOSTACHYS Ridl.

Stems tall, with lanceolate leaves. Spike or panicle from the side of the leafy stalk, on a short peduncle with sheathing leaves. Flowers small, very densely crowded, with oblong-ovate, lacinate bracts. Calyx spathaceous, short. Corolla-tube short and thick, the lobes oblong, fleshy. Lip flat, oblong. Staminodes two, short, subulate processes. Stamen short and thick. Anther oblong, emarginate, crestless or crested. Capsule ovoid or oblong, crustaceous, 3-celled. Seeds 3 or 4 in each cell.

Species 5, Malay Peninsula and Archipelago.

1. **P. philippinensis** Ridl. in Elm. Leaf. Philip. Bot. 2 (1909) 572.

Stems 1 to 2 m tall. Leaves lanceolate, acuminate, narrowed at the base, 20 cm long, 8 cm wide, glabrous on the upper surface, more or less pubescent beneath; ligule truncate; sheath hairy; petiole winged in adult leaves. Inflorescence lateral, near the base, simple, or 3-branched, cone-shaped, 6 cm long, the branches 4 to 6 cm long, the peduncle stout, covered with ovate sheaths, the rachis and bracts felted-pubescent. Bracts lanceolate, acuminate, woolly. Flowers pale-red. Calyx tubular, bilobed

at the tip, woolly, 1 cm long. Corolla-tube a little longer, the lobes linear-oblong, hooded, all hairy, white with red streaks. Lip obovate, glabrous, with a narrow, bifid, terminal portion, the central bar elevated, fleshy and warty, ending in two short warty elevated arms at the base of the terminal lobe. Staminodes flat, spathulate, as long as the short filament. Anther thick, the crest rounded, distinct. Ovary silky. Capsule obconic, the tip broad, rounded, 1 cm.

LUZON, Province of Tayabas, Lucban, *Elmer 7915*: Province of Laguna, *For. Bur. 9567 bis Curran*. MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 855*: Province of Misamis, Mount Malindang, *For. Bur. 4574 Mearns & Hutchinson*: District of Davao, Mount Apo, *Copeland 1202*.

Both Mrs. Clemens and Mr. Elmer state that the species is common. It is rather remarkable for the wooliness of its inflorescence and for the distinct prolongation of the anther-connective which extends beyond the anther-cells, and also for the shape of the lip.

Endemic.

2. *P. elegans* sp. nov.

Stems 40 cm tall, glabrous. Leaves narrowly lanceolate, acuminate, caudate, the base acuminate, petiolate, glabrous, 23 cm long, 2 cm wide; sheath ribbed, glabrous; ligule short, truncate, bifid. Spike less than half-way, protruding from the stem, 2 cm long and thick, simple, obovoid, dense. Bracts broad, wrapping the base of the flower, oblong-ovate, cuspidate, pubescent. Calyx urceolate, ampliate, 5 mm longer than the corolla-tube, the lobes 3, ovate, rather large, all hairy. Corolla-tube short and thick, the lobes lanceolate, the upper one hooded, with a conic mucro, the others blunt. Lip short, broad, quadrate, oblong, bilobed at the apex, base pubescent. Staminodes subulate. Anther oblong, pubescent along the cells which are divaricate at the apex, the connective truncate, not projecting beyond the cells.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens*, July, 1907.

A very distinct species, the smallest known one in the genus.

3. *P. ? parviflora* comb. nov.

Amomum parviflorum Presl Rel. Haenk. 1 (1827) 112, t. 19.

Alpinia parviflora Rolfe; Vidal Phan. Cuming. Philip. (1885) 152, partim; K. Schum. in Engl. Bot. Jahrb. 27 (1899) 299; Pflanzenreich 20 (1904) 368.

A slender herb from a horizontal tuberous rhizome. Stems 50 cm tall. Leaves lanceolate or linear-lanceolate, attenuate-acuminate and cuspidate, narrowed at the base, quite glabrous, 30 cm long, 2 cm wide; petiole distinct, 2 cm long; ligule very short, truncate, glabrous. Spike emerging from a leaf-axil shortly above the rhizome, erect, short-peduncled, dense or very dense, looser below, cylindric, obtuse, 5 cm long, 2.5 cm thick. Bracts ovate, acuminate, membranaceous, densely silky-tomentose, 10 mm long. Bracteoles tubular-campanulate, trilobulate, white, glabrous. Ovary glabrous. Calyx 3-lobed, the lobes 5 mm long, triangular, acute, glabrous. Corolla-tube 1 cm long, glabrous. Upper lobe cucullate, 3 mm long, lateral lobe shorter and wider. Lip

oblong, subpanduriform, above and at the lip warty-crested. Staminal nodes subglobose. Stamen-filament linear, the connective prolonged, tridentate. Anther 2 mm long.

LUZON, (*Haenke*).

I have seen nothing corresponding to this description, nor have I seen Presl's figure quoted above. Schumann makes it to be an *Alpinia* of the section *Bintalua*, which includes this and the next species and a Bornean plant (from Bintulan, whence the name). It is pretty clear from the description that the two Philippine plants are not *Alpinias*, but are probably *Plagiostachys*.

4. **P.? Rolfei** comb. nov.

Alpinia parviflora Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 316, partim, nomen nudum.

A. Rolfei K. Schum. in Pflanzenreich 20 (1904) 368.

Stem fairly stout. Leaves linear-lanceolate, acuminate, caudate, narrowed at the base, glabrous on both sides, 45 cm long, 8 cm wide; petiole 4 cm long; ligule short, glabrous. Spike projected from a leaf-sheath above the rhizome, cylindric, very dense, the base laxer, obtuse. Bracts at the apex subcomose, 10 cm long, the peduncle with rather large ovate bracts. Bracts clavate, apiculate, 12 mm long, obliquely truncate, the apex only minutely pilose. Ovary glabrous. Calyx cylindric, 12 mm long, 3-toothed, glabrous. Corolla-tube 10 mm long, the upper lobe cucullate, 6 mm long. Filament linear, 3 mm long, crestless. Lip obovate, bilobed, 5 mm long.

LUZON, (*Cuming 1327*, Albay Province, fide Rolfe; Cagayan Province fide Cuming's own list of localities).

I have seen no specimens answering to this description, which is translated from Schumann. It can not be an *Alpinia*, and I think it is probably a *Plagiostachys*.

11. **ADELMERIA** Ridl. in Elm. Leaf. Philip. Bot. 2 (1909) 603.

(*Elmeria* Ridl. l. c. 569, non *Elmera* Rydb. 1905.)

Herbs with few or solitary stems of moderate height. Leaves lanceolate or elliptic. Inflorescence a terminal capitulum. Bracts large, ovate, persistent. Bracteoles utricular, with three acute lobes, ciliate at the tip, the nerves of the bracts and bracteoles anastomosing. Calyx tubular, trifid. Corolla-tube longer, fleshy, the lobes thin, rounded. Lip fleshy, adnate to the stamen. Anther quite entire or bifid, short. Staminal nodes none. Stamen-filament broad, linear. Anther-cells linear, pubescent, the crest small or none. Style short, slender, filiform. Capsule subglobose, terminated by the calyx-tube, few-seeded.

Philippines; endemic.

Lip bifid 1. *A. bifida*
Lip entire 2. *A. pinetorum*

1. **A. bifida** Ridl. l. c.

Hornstedtia paradoxa Ridl. in Govt. Lab. Publ. (Philip.) 35 (1905) 85.

Elmeria bifida Ridl. in Elmer's Leaf. Philip. Bot. 2 (1909) 568.

Stems solitary, erect or drooping, 1 to 3 m tall, slender. Leaves lanceolate, acuminate, caudate, glabrous, 30 to 45 cm long, 2 to 7 cm

wide, narrowed at the base to a short petiole; ligule oblong, truncate, bilobed, glabrous or nearly so; sheath-margins pubescent. Capitulum ovoid, rounded, nodding, 7 cm long, yellowish-red. Outer bracts ovate, rounded, margins sparingly ciliate, the nerves elevated, anastomosing. Bracteole utricular, inclosing two flowers, tip 3-pointed, ciliate. Calyx tubular, 3-lobed, the lobes acute, ciliate at the tip. Corolla fleshy, tube moderately long, the lobes oblong, the upper one oblong-ovate. Lip adnate at the base to the corolla-tube and stamen, thick, fleshy, deeply bilobed into two linear excurved lobes, convolute when dry. Stamen-filament broad. Anther cells linear, pubescent, appendage small, ovate. Capsule glabrous, subglobose, with few seeds.

LUZON, Mount Banajao, Province of Tayabas, *Elmer* 7396; Lucban, *Elmer* 7706: Province of Benguet, Mount Santo Tomas, *Elmer* 6629; Pauai to Baguio, *Merrill* 4786. MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens* 1210.

Endemic, in dense woods at 1,000 to 2,100 m altitude. Margins of the sheaths purplish-red. Cone dark-red. Bracts reddish, with green margins. Flowers yellowish. Complete specimens show that this plant is no *Hornstedtia* or rather *Nicolaia*, but a distinct genus.

2. *A. pinetorum* comb. nov.

Elmeria pinetorum Ridl. l. c. 569.

Plant 2 m tall, all the stems much reclining or recurved. Leaves elliptic or elliptic-lanceolate, acuminate, glabrous, except on the midrib, beneath pubescent and above shortly hairy, the margins ciliate-hairy, 15 cm long, 4 cm wide, base subcuneate, dark-green; petiole very short; ligule 2 mm long, thickly white-ciliate; sheath 7 cm long, edged with stiff white hairs. Capitulum terminal, nodding, globose, 6 cm long, the outer bracts ovate, rounded at the tip, finely striate, glabrous except the white-ciliate edge, dull-red. Bracteole utricular, with three acute lobes, white-hairy at the tip, inclosing two flowers. Calyx tubular, a little longer, with three acute points with tufts of hair at the tips. Corolla-tube cylindric, glabrous, 2 cm long, dilated above, the lobes short, oblong, yellow. Lip fleshy, entire, base saccate, oblong, limb triangular, acute. Stamen shorter, the anther broad, apex deeply excavate. Style slender, shorter. Stigma small, red.

LUZON, Province of Benguet, Baguio, *Elmer* 8548, in small tufts on limestone formation in the pine region at 5,000 ft. altitude, rare, native (Igorot) name *Barapat*.

12. *LEPTOSOLENA* Presl.

Tall herbs with linear or lanceolate leaves. Inflorescence terminal, paniculate. Flowers sessile or pedicelled, large. Calyx tubular, 3-lobed, split on one side. Corolla-tube longer, lobes linear or lanceolate. Lip entire, oblong, convolute. Staminodes linear-oblong. Stamen short; anther oblong, crested or not.

Referred by Schumann to *Alpinia*, but certainly quite distinct and perhaps allied to *Hedychium*. Species two, endemic.

Flowers pedicelled, 7 cm long..... 1. *L. Haenkei*
Flowers sessile, 12 cm long..... 2. *L. insignis*

1. **L. Haenkei** Presl Rel. Haenk. 1 (1827) 111, t. 18.*Alpinia leptosolenia* K. Schum. in Pflanzenreich 20 (1904) 312.

Stem fairly tall. Leaves sessile, lanceolate, attenuate-acuminate, caudate, base acute, glabrous, 30 cm long, 2.2 cm wide; ligule 2 mm long, retuse, glabrous. Panicle erect, 7 cm long, ovate, many-flowered, rachis glabrous, with usually four bracts at the base. Flowers pedicelled, the pedicels 2.5 cm long. Ovary glabrous. Calyx tubular, 1.5 cm long, tip shortly 2-lobed. Corolla-tube 7 cm long, narrowly tubular, glabrous, the lobes 1.2 cm long, oblong-lanceolate, obtuse. Lip twice as long, oblong, obtuse, recurved. Stamen-filament very short. Anther 5 mm long, connective not prolonged.

LUZON, (*Haenke*).2. **L. insignis** Ridl. in Govt. Lab. Publ. (Philip.) 35 (1905) 84.

Stem 1 to 2 m tall. Leaves linear, acuminate, glabrous, narrowed to the base, tip caudate, 25 cm long, 1 cm wide, midrib stout; sheaths 15 cm long, with the ligule as an erect pair of auricles oblong and rounded at the tip. Bracts at the base of the inflorescence 3, papery, lanceolate, caudate, 15 cm long, 2 cm wide. Panicle 7 cm long, with distant, 2 cm long branches, each bearing two or three flowers. Flowers sessile, white. Calyx tubular, 6 cm long, bilobed, the lobes short, ovate, the tube split down one side. Corolla-tube slender, 12 cm long, the lobes linear-oblong, obtuse, 2 cm long. Staminodes linear-oblong, shorter and narrower. Lip fleshy, elongate, 2 cm long, rolled up when withered. Stamen short. Anther oblong, the crest broader, large, rounded, entire. Style longer. Stigma cup-shaped, hairy.

LUZON, Province of Benguet, Twin Peaks, *Elmer* 6428, on gravelly land-slides in the pine region.

13. **KOLOWRATIA** Presl.

Tall herbs. Leaves lanceolate or oblong-lanceolate, petioled, the ligule entire. Inflorescence terminal, branched, rachis flexuous. Spikes alternate, distant, with linear-oblong bracts, densely arranged. Calyx spathaceous, cleft on one side, apex trifid. Corolla-tube short, the lobes broad, hooded. Staminodes subulate. Lip small, obovate, with trilobed apex. Stamen-filament broad, fleshy, adnate to the corolla-tube. Anther linear, elongate, with a short prolongation of the connective. Capsule woody.

Species two, endemic.

1. **K. elegans** Presl Rel. Haenk. 1 (1827) 113, t. 20.*Renealmia gracilis* Blanco Fl. Filip. (1837) 1.*Renealmia exaltata* Blanco l. c. ed. 2 (1845) 1.*Alpinia gracilis* Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 316.*Alpinia gigantea* F.-Vill. Nov. App. (1883) 225.

Alpinia elegans K. Schum. in Engl. Bot. Jahrb. 27 (1899) 288; Pflanzenreich 20 (1904) 352.

A tall stout herb 2 to 4 m tall, with a stout rhizome, the bases of the stems swollen. Leaves coriaceous, usually reflexed, glabrous, oblong-lanceolate, the apex acute, cuspidate, base rounded, nearly or quite sessile, 30 cm long, 8 cm wide; ligule rounded, entire, reticulate, hairy, 8 mm long; sheath ribbed, hairy above. Inflorescence terminal, 30 cm long, the base of the peduncle covered with a long, papery, linear-lanceolate bract 15 cm long, the rachis above flexuous. Flower-spikes about 8, distant, alternate, sessile, 5 cm long. Bracts linear-oblong, as long as the spike, 1 cm wide, pubescent, the margins ciliate. Flowers 5 or 6 on stout peduncles. Inner bracts keeled. Calyx spathaceous, stiff, 5 cm long, reddish, split to the base on one side, apex with three short, silky points, pubescent. Corolla creamy, as long as the calyx, the tube cylindric, hairy, dilate at the apex, 3 cm long, the upper lobe hooded, lanceolate, mucronulate, 3 cm long, the lateral ones oblong, obtuse, keeled at the tips, mucronate. Lip shorter, obovate, subtrilobed at the apex, blunt. Stamen nearly as long as the upper sepal. Anther linear, curved, 2 cm long, the connective shortly prolonged above the anther-cells, rounded, entire. Style slender, filiform. Capsule woody, ovoid, dehiscing into three segments, 4 cm long; each segment 2 cm wide, yellow, glabrous.

* LUZON, Province of Sorsogon, Sorsogon, (*Haenke*): Province of Bataan, Lamao River, Mount Mariveles, *Whitford* 73, *Williams* 309: Province of Bulacan, *For. Bur.* 7217 *Curran*: Province of Rizal, *Bur. Sci.* 35 *Foxworthy*, *Merrill* 1695: Province of Nueva Ecija, Carranglang, *Merrill* 239: Province of Pampanga, Mount Arayat, *Merrill* 1413, *Bolster* 18: Province of Tayabas, Atimonan, *Gregory* 14: Province of Benguet, Baguio, *Elmer* 8610. MINDORO, Baco, *Merrill* 1271. LEXTE, Palo, *Elmer* 7258, 7287.

Endemic; very common in thickets along streams in ravines etc.

In some specimens the leaves are very much larger, oblong, and distinctly petioled, 60 cm long, 15 cm wide, with a terminal filiform point 10 cm long, and a petiole nearly 2 cm long, probably the lower or middle leaves on the stem, or perhaps a large form. The leaves on the growing plant are reflexed.

Schumann puts this striking plant under the genus *Alpinia*, which I can not indorse. The genus, however, as he limits it is so wide that it contains many other plants at least as distinct as are most of the genera of *Scitamineae*.

2. *K. erucaeformis* sp. nov.

Stem 3 m tall, reed-like, with distichous, rather coriaceous leaves, which are linear, acuminate, glabrous, 34 cm long, 4 cm wide, the base broad; petiole none; ligule very short, rounded, glabrous. Panicle terminal, 10 cm long, with 6 branches. Branches cylindric, over 5 mm thick, covered with ovate, acute, keeled, ribbed, gray sheaths, pubescent when young. Pedicels short. Calyx spathaceous, with three small points, glabrous, 2 cm long. Corolla-tube shorter, the upper lobe ovate, 2 cm long, the lower ones connate, oblong, ovate, rounded, thinner. Lip shorter, obovate, trilobed, lobes rounded, terminal one entire, thin-textured.

tured, the central bar thickened. Staminodes connate, forming an excavate, rather fleshy, pubescent organ with two thick subulate points at the tip, and one on each side below. Stamen-filament extremely short. Anther long, oblong, pubescent, the crest oblong, truncate, obscurely 3-lobed, with four nerves. Stigma very large, triangular, excavate in front, hairy. Fruit subglobose, glabrous.

BUCAS ISLAND, (northeast coast of Mindanao), *Merrill 5258*, dry slopes at 15 m altitude along the borders of forests. Calyx red, corolla white, fruit reddish-yellow.

A very curious plant, remarkable for the completely connate lower petals, and connate staminodes.

14. *ALPINIA* Linn.

Rhizome short or fairly long, aromatic. Stems tall, leafy. Leaves lanceolate, shortly petiolate; ligule short. Panicles terminal, the flowers numerous, often showy. Bracts caducous, often petaloid. Calyx-tube short, tubular. Corolla-tube thick, little longer, the lobes linear or oblong. Lip large, convolute, or small, narrow, lobed or entire. Staminodes broad and spathulate or reduced to narrow subulate processes or absent. Stamen-filament thick. Anther broad, the crest usually absent. Fruit globose or cylindric, yellow to black. Seeds numerous, angled, black, inclosed in a sweet aril.

Species about 60, Indo-Malayan, Siamese, Chinese and Australian.

§ CATIMBIUM. Flowers large, the lip entire or subentire, convolute.

- Leaves slightly pubescent; staminodes short, oblong..... 1. *A. Haenkei*
- Leaves densely velvety beneath; staminodes linear, glabrous.... 2. *A. Copelandii*
- Leaves tomentose on both sides; staminodes hairy..... 3. *A. trachyascus*
- Leaves thickly pubescent beneath; staminodes ovate, hairy..... 4. *A. illustris*
- Leaves glabrous.

Plant 1 to 2 m tall; staminodes two low crests, silky-hairy at the base.

5. *A. glabrescens*

Plant 6 m tall; staminodes linear-oblong, glabrous..... 6. *A. musaeifolia*

§ HELLENIA. Flowers small, lip clawed, usually bifid, often 4-fid, not convolute; panicle lax.

Panicle large, spreading.

Corolla pubescent 7. *A. pyramidata*

Corolla glabrous 8. *A. Cumingii*

Panicle long, dense, pendulous..... 9. *A. penduliflora*

Panicle slender, branches 2 or 3, or short.

Inflorescence pubescent 10. *A. pubiflora*

Inflorescence glabrous.

Lip fan-shaped, not lobed..... 11. *A. flabellata*

Lip doubly bifid.

Staminodes bifid 12. *A. pulchella*

Staminodes entire.

Leaves very narrow 13. *A. graminea*

Leaves lanceolate.

Stamen crested 14. *A. Foxworthyi*

Stamen not crested 15. *A. brevilabris*

§ OLIGOCINCNUS. Panicle-branches spiciform 15. *A. rufa*

§ CATIMBIUM.

1. *A. Haenkei* Presl Symb. Bot. (1832) 66, t. 43; K. Schum. in Pflanzenreich 20 (1904) 341.

A. malaccensis Presl Rel. Haenk. 1 (1827) 110, non Roscoe.

A. philippinensis Ridl. in Govt. Lab. Publ. (Philip.) 35 (1905) 86.

Stem 1 to 2 m tall. Leaves oblong-lanceolate or lanceolate, acuminate, base rounded or acuminate, 33 to 55 cm long, 5 to 9 cm wide, hairy on both surfaces or glabrescent above, the edges thickly ciliate-hairy; petiole 3 cm long; ligule bifid, the lobes rounded at the tip, hairy, especially at the tip; sheath hairy. Inflorescence simple or shortly paniculate, 15 to 30 cm long, rachis, branches and pedicels closely silky-hairy. Bracts ovate-oblong or elliptic, 1.5 to 2 cm long, usually hairy, especially at the tip. Calyx short, broadly campanulate, 3-lobed, lobes ovate, acute, hairy, 1 cm long. Corolla-tube shorter, hairy, the lobes white or pink, oblong, obtuse, hairy, 2 cm long, the upper one hooded. Lip broadly ovate, the lateral lobes hardly distinct, 1 cm. long, apex oblong, truncate, narrower, crisped and more or less bifid, all glabrous, orange-yellow with red spots and streaks, except in the mouth of the tube, where there is on either side a line of silky hairs leading from the curved, short, oblong staminodes. Filament linear, hairy. Anther rather short, broad, glabrous. Ovary silky. Capsule globose, 2 cm long, sprinkled with hairs or more hairy when young, red.

LUZON, Province of Bataan, *For. Bur.* 1203, 1777, 2477, 2729 *Borden, For. Bur.* 144 *Barnes, For. Bur.* 2496 *Meyer, Whitford* 1058: Province of Pampanga, Mount Abu, *Bur. Sci.* 1942 *Foxworthy*: Province of Benguet, Sablan, *Elmer* 6089: Province of Zambales, *For. Bur.* 6008 *Curran*: Province of Laguna, *For. Bur.* 8904 *Curran*. MINDORO, Baco River, *Merrill* 4047, *McGregor* 158. NEGROS, Canlaon Volcano, *Bur. Sci.* 1143 *Banks*; Gimagaan River, *Whitford* 1570. LEYTE, Palo, *Elmer* 7290. NEGROS, *Elmer* 10244. PALAWAN, San Antonio Bay, *Merrill* 858. BALABAC, *Bur. Sci.* 408 *Mangubat*. In shady damp forests near watercourses, endemic.

Alpinia Haenkei is certainly closely allied to *A. malaccensis* Roxb. chiefly differing in its smaller size in all parts. *A. malaccensis* Roxb. is a native of Chittagong, and does not occur, except as a garden plant, in the Malay region. *A. malaccensis* Roscoe, the original species of that name, is based on a figure and description of Rumphius in Herbarium Amboinense, and is indeterminable. The fine series of specimens cited above, leaves me with very little doubt that my *A. philippinensis* is only a form of *A. Haenkei*, which is widely distributed in the Philippines.

2. *A. Copelandii* sp. nov.

Stem 2 m tall. Leaves oblong-lanceolate, long-cuspidate, the base unequal, cuneate, the upper surface glabrous, except the hairy channeled midrib and edge, the lower surface velvety silky-pubescent, 56 cm long, 10 cm wide; petiole stout, 7 mm long, hairy; ligule 1 cm, bilobed, the lobes subacute, velvety; sheaths pubescent. Raceme stout, peduncle stout, 10 cm long, densely yellow-hairy, the inflorescence 15 cm long, crowded, the pedicels short, yellow-hairy. Bracts oblong, 2 cm long, sparsely pubescent. Calyx broad, 1 cm longer than the corolla-tube,

bilobed. Corolla-tube short, the lobes oblong, truncate, 2 cm long, silky-hairy. Lip broadly rhomboidal, 4 cm wide, 3.5 cm long, lateral lobes very large, the apex (terminal lobe) quadrate, shortly bilobed, the disk at the base of the middle lobe regularly pustular. Staminodes linear, 1-veined, glabrous. Stamen-filament glabrous. Anther short.

MINDANAO, District of Zamboanga, *Copeland*, February, 1905.

3. ***A. trachyascus*** K. Schum. in *Pflanzenreich* 20 (1904) 336.

Moderately tall. Leaves lanceolate, attenuate-acuminate and caudate, the base acute, both surfaces subtomentose, especially the lower one, the edges shortly and densely subgolden-ciliolate, 60 to 65 cm long, 6 to 7 cm wide; sheaths striate, tip and upper edge golden-tomentose; petiole 8 cm long; ligule acute, nearly 1 cm long, coriaceous, subtomentose. Raceme-rachis glabrous. Pedicels 6 to 7 cm long, golden-tomentose. Bracts fusiform before opening, 3 to 3.2 cm long, scabrid with dense, rigid, very short hairs. Ovary silky. Calyx before flowering 2.2 cm long, tridentate, the two posterior teeth longer. Corolla silky outside. Staminodes golden-hairy.

MINDANAO, District of Davao, Sibulan, in forests, (*Warburg 14584*), in Herb. Berol.

Endemic.

The lip is not described, but the distinctive characters of the plant are given as the rough bracts and the rather lax raceme which is also said to be glabrous.

4. ***A. illustris*** sp. nov.

Stem 3 m tall. Leaves large, 65 cm long or more, 6 to 9 cm wide, oblong, petioled, cuspidate, the lamina sparingly pubescent on the upper surface, thickly pubescent beneath; petiole 4 cm long, densely pubescent; ligule short, densely hairy; sheath very sparsely pubescent. Panicle dense and large, over 30 cm long, the rachis thick hairy. Branches short, 2- or 1-flowered, densely hairy. Bract large, oblong, hairy, 3 cm long. Corolla-tube short. Petals oblong, obtuse, the upper one hooded, 2 cm long, 5 mm wide, hairy. Lip 4 cm long, 2.5 cm wide, rhomboid when spread out, the lateral lobes subacute and narrow, apex crisped, denticulate. Staminodes a pair of ovate, rounded lobes, densely hairy at the base, rather large, attached to the lip. The lip has a central channel with two side ribs and is bullate along the outside of the ribs. Stamen-filament densely hairy, 1.5 cm long, the anther nearly as long.

PALAWAN, *Bur. Sci. 514 Foxworthy*.

Allied to *A. nobilis* Ridl. but the flowers are smaller and the lip narrower and more distinctly lobed.

5. ***A. glabrescens*** sp. nov.

Stems 1 to 2 m tall. Leaves almost completely glabrous, subcoriaceous, oblong, acuminate with a long cusp, 30 cm long, 10 cm wide, the cusp 4 cm long, the base narrowed to a short, 1 cm long, stout, glabrous petiole; ligule longer, entire, hairy on the back; sheath strongly ribbed, glabrous. Panicle over 15 cm long, on a peduncle equally long covered with close,

stiff, short, rusty hairs. Branches of the inflorescence usually 2-flowered. Bracts oblong, cuspidate, 2 cm long, glabrous except the pubescent tip and cusp. Ovary globose, scabrid. Calyx campanulate, 1.5 cm long, 3-lobed, the lobes acute, deeply split on one side, scabrid-pubescent. Corolla-tube shorter, glabrous, the lobes broadly oblong, truncate, the upper one 2 cm long, 1 cm wide. Lip 3 cm long, ovate, acuminate, the apex rounded, crisped, retuse, a central keel near the base, apparently yellow, blotched with red. Staminodes two low rounded crests covered at the base with silky hairs, the mouth of the corolla-tube also silky-hairy. Filament long, glabrous. Anther short. Capsule 2 cm long, nearly glabrous, a few hairs at the base, strongly ribbed.

BATANES ISLANDS, Santo Domingo de Basco, *Bur. Sci.* 3679 *Fénix*, *Bur. Sci.* 3141 *Mearns*. Hillsides; flowers yellow.

6. *A. musaefolia* Ridl. in *Elm. Leaf.* Philip. Bot. 2 (1909) 604.

Stems two or three together, about 6 m tall, 14 cm in diameter at the base. Leaves three to five on a stem, 14 to 20 cm apart, oblong, glabrous, subherbaceous, 1.2 to 2.1 m long, 24 cm wide, midrib stout, dark green above, paler beneath; petiole 10 cm long. Inflorescence terminal, glabrous, spicate, the peduncle 30 cm long, 2 cm thick, the rachis about 60 cm long. Flowers subsessile, pedicels thick, 3 mm long. Calyx campanulate, broad, 1 cm long, the lobes short, rounded, glabrous, green. Corolla-tube as long as the calyx, thick, the lobes broad, oblong, thick-textured, succulent, the upper one hooded, 1 cm long, white, the lip a little longer and with thinner edges, lanceolate, boat-shaped, entire, the apex blunt, entire. Staminodes rather large, linear-oblong, fleshy, glabrous, obtuse. Anther linear-oblong, the connective slightly prolonged and emarginate. Fruit obovoid, glabrous, smooth.

NEGROS, Cuernos Mountains, near Dumaguete, *Elmer* 9539, at an altitude of about 1200 m. A remarkable plant on account of its banana-like size and habit, and absolutely glabrous in all parts. Its nearest affinity is with *A. glabrescens* Ridl.

Endemic.

§ HELLENIA.

7. *A. pyramidata* Blume Enum. Pl. Jav. 1 (1827) 58.

A. galanga Sw. var. *pyramidata* (Blume) K. Schum.; *Pflanzenreich* 20 (1904) 316.

Stem tall and stout. Leaves lanceolate, acute, the base acuminate, 45 cm long, 8 cm wide, the upper surface glabrous, beneath hairy; petiole hardly distinct, 1 cm long; ligule nearly as long. Panicle dense, many-flowered, 35 cm long, the rachis below very stout, densely pubescent, branches 2 cm long. Bracts lanceolate, deflexed, 5 mm long. Flowers 3 cm long, the pedicel 8 mm. Calyx short, tubular, equally 3-lobed, the lobes triangular, acute, pubescent, 1 cm long. Corolla-tube a little longer, thick, the lobes linear-oblong, the upper one hooded, all pubescent. Lip spatulate, the claw straight, the limb triangular, base cuneate, apex

deeply bifid, the lobes again retuse, almost bilobed, margins toothed. Staminodes rather large, fleshy, subulate. Stamen-filament linear, channeled. Anther linear-oblong, the connective much broader than the narrow cells.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens* 612. NEGROS, *Elmer* 10314.

Java and Borneo.

Schumann makes this only a variety of the commonly cultivated *A. galanga* Sw. but apart from its hairiness the lip and staminodes are very different.

8. *A. cumingii* K. Schum. in *Pflanzenreich* 20 (1904) 315.

Not a stout plant in proportion to its inflorescence. Leaves subsessile, linear-lanceolate, acuminate, attenuate, subfiliform-caudate, glabrous except for the puberulous edge and tip, 45 cm long, 5.5 cm wide; petiole 5 mm long; ligule coriaceous, 5 mm long, the edge ciliate. Panicle long, narrowly cylindric, 40 cm long; branches 6-flowered, crowded, the rachis pilose. Bracts small, oblong, 2 mm long, caducous. Pedicels 2 cm long. Ovary glabrous, 2.5 mm long, elliptic. Calyx tubular, 1 cm long, puberulous, shortly 3-lobed, the lobes ovate, hairy on the edges. Corolla-tube distinctly longer, glabrous, the lobes linear-oblong, hooded. Lip shorter, deeply bifid, the lobes again shortly divided, the outer lobule ovate, the inner linear, cylindric, blunt. Staminodes linear-subulate, shorter than the claw of the limb. Stamen-filament a little longer than the lip; anther nearly as long, glabrous, crestless.

LUZON, Province of Albay, (*Cuming* 859).

Endemic.

9. *A. penduliflora* Ridl. in *Elm. Leaf. Philip. Bot.* 2 (1909) 571.

A tufted plant 3 to 4 m tall. Leaves elliptic-lanceolate, acute, acuminate, base rounded, glabrous, 35 cm long, 16 cm wide, the midrib stout, the petiole very short; ligule as long as the petiole, truncate, entire; sheath broad, glabrous. Inflorescence 45 cm to 1 m long, terminal, pendulous; peduncle short, the rachis stout; branches very numerous, puberulous, 2 cm long, clustered, with short, lateral, erect branchlets. Bracts small, ovate, puberulous. Calyx tubular, about 1 cm long, trifid, with three pubescent, subacute, lanceolate lobes. Corolla-tube barely as long, the lobes white, the upper one linear-oblong, obtuse, the lateral ones broader, oblong, rounded. Lip broadly obcuneate, bilobed, lobes crisped and rounded. Stamen-filament rather short and thick; anther-cells large, the crest ovate, rounded. Capsule globose, about 1 cm long, glabrous, ribbed, many-seeded.

LEYTE, Palo, *Elmer* 7288.

Perhaps most closely allied to *A. galanga* Sw.

An allied plant with similar foliage and fruit, but with a very dense raceme, with shorter, very crowded, silky branches, is represented by *For. Bur.* 947 *Barnes*, from Mount Santo Tomas, Province of Benguet, Luzon, but there are no flowers on the specimen.

Endemic.

10. *A. pubiflora* K. Schum. in *Pflanzenreich* 20 (1904) 313.

Hellenia pubiflora Benth. in Hook. Lond. Journ. Bot. 2 (1843) 235.

Stem 1 to 2 m tall, slender. Leaves narrow, linear-lanceolate, attenuate, very acuminate, glabrous, 30 cm long, 3 cm wide, narrowed to the base, hardly petioled; ligule 5 mm long, ovate, edge white-ciliate. Panicle 20 cm long, the peduncle about 10 cm long, inclosed in the upper leaf-sheaths, the two lower branches distant, 5 to 10 cm long, the upper part fairly dense, with short branchlets each carrying 3 or 4 flowers, the rachis and branches pubescent. Bracts caducous. Flowers white, nearly 2 cm long. Calyx tubular, gradually dilated upward, 3-lobed, the lobes obtuse, ovate, all pubescent. Corolla-tube hardly longer, the lobes oblong, rounded at the tip, glabrous. Lip fleshy, base narrowed, channeled, limb bifid into two unequal, linear-oblong lobes much shorter than the petals. Stamen glabrous; filament nearly twice as long as the lobes; anther half as long as the filament, crestless. Staminodes short, tooth-like, from the tube of the lip. Fruit globose, glabrous, 1 cm long, 4-seeded.

LUZON, Province of Benguet, *Elmer* 6268. GUIMARAS, *Ritchie* 34. MINDANAO, Taumo, (*Warburg* 14586): District of Davao, *Copeland* 319: District of Zamboanga, *For. Bur.* 9100 *Whitford & Hutchinson*: Province of Surigao, *Bolster* 213. Endemic.

11. *A. flabellata* sp. nov.

Stem slender, about 1 m tall. Leaves narrow, lanceolate, acuminate, with a long point, glabrous, margins denticulate at the tip, 30 cm long, 2 cm wide; petiole short, or sometimes 1 cm long; ligule ovate, entire, the margins minutely white-pubescent. Panicle rather strict, with two or three densely flowered ascending branches, glabrous, the peduncle 15 cm long, the panicle as long. Bracts minute. Calyx cylindric, tubular, the lobes 3, short, ovate, obtuse, ribbed, all glabrous, 8 mm long. Corolla-tube a little longer, the upper lobe oblong, hooded, mucronulate, the lower lobes obovate-oblong, rounded. Lip nearly as long, fan-shaped, not bifid, with a short claw, then expanding abruptly into a subreniform 4-lobed limb, the lobes subequal, the lower ones broadest, all rounded and strongly veined. Staminodes nearly as long as the claw of the lip, linear from a broad base. Stamen-filament short, linear, glabrous. Anther oblong, shorter, crestless.

LUZON, Province of Benguet, *Bur. Sci.* 2718, 2871 *Mearns*: Province of Rizal, Bosoboso, *Merrill* 1878. MINDORO, Pola, *Merrill* 2226.

Var. *major* var. nov.

A stout plant 6 m tall. Leaves ovate-lanceolate, acuminate, glabrous, 16 to 30 cm long, 5 to 7.5 cm wide, the base broad; petiole short or none;

ligule 1 cm long or less. Panicle 15 to 35 cm long. Corolla-tube hardly longer than the calyx. Flowers yellow, otherwise as in the species.

MINDANAO, Province of Misamis, Mount Malindang, *For. Bur.* 4574 Mearns & Hutchinson. MINDORO, Mount Halcon, *For. Bur.* 4458 Merritt. CAMIGUIN, Babuyan Islands, *Bur. Sci.* 4086 Fénix.

12. *A. pulchella* K. Schum. in Engl. Bot. Jahrb. 27 (1899) 276, t. 2, f. E; Pflanzenreich l. c. 315.

Globba pulchella K. Schum. Fl. Kais.-Wilhelmsl. (1889) 26.

Stem slender, 2 m tall. Leaves lanceolate, attenuate-acuminate at both ends, glabrous, 32 cm long, 6 cm wide; petiole 2.5 cm long; ligule truncate, 1 cm long. Panicle elongate, 25 cm long, with one or rarely two primary branches, glabrous. Flowers pedicelled, the pedicels 2 mm long. Bracts minute. Ovary glabrous. Calyx 5 to 6 mm long, shortly toothed. Corolla red, the tube 7 mm long, the lobes 5 mm long, blunt. Lip bilobed, the lobes bifid, white, rosy-streaked, 5 mm long. Stamen 6 mm long, crestless. Staminodes short, bifid. Capsule red, 1.2 cm in diameter, 2- or 3-seeded, the seeds 7 mm thick.

MINDANAO, near Taumo, (*Warburg*), in Herb. Berol. New Guinea.

This species differs from *Alpinia brevilabris* in its much larger capsule, and in its "staminodia bicruria". I have seen no species of *Alpinia* with lobed staminodes, and I do not understand Schumann's figure in the Pflanzenreich.

13. *A. graminea* sp. nov.

Stem 1.5 m tall, slender. Leaves very long and narrow, linear, acuminate, 30 cm long, 5 to 10 mm wide, glabrous, sessile; ligule lanceolate, adnate to the base of the leaf by its back, margins sparingly ciliate. Inflorescence very slender, 15 cm long. Flowers pink, in pairs or threes on very short, 2 mm long branchlets, glabrous, 2 cm long. Calyx long, tubular, above a little dilated, the lobes broad, ovate, rounded, mucronulate, minutely ciliate, one narrower than the others. Corolla-tube barely longer, lobes thin, oblong, obtuse, hooded. Lip deeply bifid, shorter than the corolla-lobes, fleshy, the lobes bifid, inner lobule linear, truncate, the outer rounded, ovate-oblong. Staminodes as long as the claw of the lip, fleshy, terete, subulate. Stamen-filament as long as the lip. Anther nearly as long, crestless.

NEGROS, Mount Silay, at 600 m altitude, *For. Bur.* 7267 Everett.

The flowers resemble those of *Alpinia alba* Teysm. and still more those of *A. Cumingii*, from which this differs in its narrow leaves and glabrous calyx.

14. *A. Foxworthyi* sp. nov.

Stem 1 m tall, slender. Leaves narrowly linear-lanceolate, acuminate, narrowed at the base to a very short petiole, 13 cm long, 1 cm wide, glabrous, margins at the apex armed with small brown thorns, the petiole 5 mm long; ligule small, entire, ovate, glabrous. Peduncle slender, 15

cm long or more. Panicle dense, 7 to 10 cm long, with short, 2-flowered branches. Bracts very small, caducous. Calyx short, ampliate, urceolar, 5 mm long, glabrous, the lobes very short and broadly ovate. Corolla-tube a little longer, the upper lobe oblong, hooded, the lateral ones oblong, blunt. Lip flabellate, 4-lobed, the claw thick, rather short, the two lateral lobes of the limb broad, rounded, the middle one bifid, the lobules narrow, triangular-lanceolate, limb strongly nerved. Staminodes short, subulate. Anther very short, crested, the crest large, oblong, truncate; filament short.

PALAWAN, near Iwahig, *Bur. Sci.* 772 *Foxworthy*. Flowers white.

Allied to *A. conchigera* and to *A. rosella* Ridl.

15. *A. brevilabris* Presl Rel. Haenk. 1 (1827) 110, *t.* 17; Schum. in *Pflanzenreich* 1 c. 314.

Stem 2 to 3 m tall. Leaves lanceolate, acuminate, 18 to 30 cm long, 3 to 8 cm wide, glabrous, denticulate on the edge near the tip; petiole 5 mm long; ligule ovate, rounded, entire, minutely white-ciliate at the tip; sheath glabrous, striate. Panicle 25 cm long, the peduncle nearly the same length, glabrous, branches two, 8 cm long, the terminal portion with short branchlets, each with 3 or 4 flowers. Bracts caducous. Calyx tubular, 1 cm long, 3-lobed, the lobes ovate, short, glabrous. Corolla-tube one-fourth longer than the calyx, the lobes short, broad, oblong-ovate, blunt, rounded at the tip. Lip short, broadly and shortly bilobed, the lobes bilobed, the lobules oblong, truncate, divaricate. Staminodes simple, linear, fleshy, half as long as the filament, which is hardly longer than the 1 cm long crestless anther. Fruit globose, glabrous, bright-red, 5 mm in diameter.

LUZON, Province of Bataan, *Whitford* 58, *For. Bur.* 6520 *Curran*, *For. Bur.* 2203 *Meyer*, *Elmer* 6859, 6853, *For. Bur.* 1202, 2931 *Borden*, *Merrill* 5193: Province of Benguet, *Elmer* 6268: Province of Zambales, *Merrill* 2073: Province of Tayabas, *Whitford* 655, *Gregory* 55. BATAN, Batanes Islands, Santo Domingo de Basco, *Bur. Sci.* 3580 *Fénix*. MINDORO, Baco River, *McGregor* 162, 184, *For. Bur.* 5253, 5489 *Merritt*. MASBATE, *For. Bur.* 1703 *Clark*. BASILAN, *For. Bur.* 3999 *Hutchinson*. NEGROS, *Elmer* 9501, 9531.

Alpinia brevilabris seems to be a rather abundant species, as well as widely distributed in the Philippines. Most of the collectors give the color of the flowers as white with pink veining.

§ OLIGOCINCNUS.

16. *A. rufa* K. Schum. in *Engl. Bot. Jahrb.* 27 (1899) 293; *Pflanzenreich* 1. c. 361.

Hellenia rufa Presl Rel. Haenk. 1 (1827) 114, *t.* 21.

Stems 1.5 m tall, rather slender. Leaves elliptic-lanceolate or lanceolate, rather abruptly cuspidate, sessile, 25 to 30 cm long, 4 to 6 cm wide, hairy all over with long appressed hairs; ligule oblong, obtuse, densely

villous-hairy; sheath villous especially on the keel and edges. Panicle 5 to 8 cm long, with a short villous rachis and 5 to 8 branches from 3 to 7 cm long, covered with short, ovate, ribbed, persistent bracts. Basal bracts linear-lanceolate, 1 cm long, villous. Flowers shortly pedicelled, 14 mm long. Calyx cylindric, 3-toothed, villous. Corolla-tube exceeding the calyx, 14 mm long, the lobes linear-oblong, the upper one largest, hooded, the other two with a kind of terminal boss, all hairy, the two lateral ones only near the tip. Lip short, bifid to the mouth of the tube, the lobes linear-oblong, truncate, glabrous, adnate to the linear, acute staminodes which are nearly as long, and to the stamen-filament which is linear, glabrous and rather short. Anther oblong, with a small semi-ovate crest. Capsule globose, 1.2 cm in diameter, red, sprinkled with scattered hairs. Seeds 5 mm long, subtrigonus, smooth.

LUZON, Province of Sorsogon, (*Haenke*): Province of Tayabas, (*Warburg*), *Elmer* 9078. NEGROS, Gimagaan River, *Copeland*, *Whitford* 1649; Talaban River, *For. Bur.* 5590 *Everett*; Cuernos Mountains, *Elmer* 9578. MINDANAO, Dagatpan, (*Warburg*). BUCAS, *Merrill* 5273.

DOUBTFUL SPECIES.

A. mollis Presl Rel. Haenk 1 (1827) 110; K. Schum. l. c. 369.

A slender herb, the stems 30 cm long. Sheaths glabrous, striate. Leaves shortly petiolate, oblong-lanceolate, acuminate, narrowed into a petiole, the upper surface glabrous, beneath silky-tomentose, soft, 13 to 16 cm long, 2.3 cm wide; ligule 4 mm long, obtuse, villous. Panicle erect, terminal, with sometimes a longer branch at the base. Rachis velvety. Flowers very shortly pedicelled, unknown. Capsule globose, 6 to 10 mm in diameter, yellowish, subtomentose, few-seeded.

LUZON, (*Haenke*).

Schumann was unable to find the type of this species, and the description is too imperfect to identify it.

15. **COSTUS** Linn.

Tall herbs, the stems often spiral, sometimes branched. Leaves lanceolate, shortly petioled, the ligule forming a complete ring. Flower-spike terminal or basal. Bracts stiff, often spiny. Calyx tubular, 3-lobed. Corolla-tube broad-funnel-shaped, as long as the calyx-tube, the lobes large, lanceolate or oblong. Lip large, obovate, usually entire, broadly trumpet-shaped. Staminodes absent. Stamen very broad and thin, the connective large, acute or curved upward. Anther-cells linear. Fruit a woody capsule splitting on one side. Seeds numerous, angled.

Species about 40, chiefly South American and African; a few Indo-Malayan.

Spike terminal on the leafy stem..... 1. *C. speciosus*
Spike radical 2. *C. clemensae*

1. *C. speciosus* Sm. in Trans. Linn. Soc. 1 (1800) 249; Roxb. Fl. Ind. 1 (1820) 58; Blume Enum. Pl. Jav. 1 (1827) 61; Wight Icon. t. 2014; Horan. Monogr. (1862) 37; Baker in Hook. f. Fl. Brit. Ind. 6 (1892) 249; K. Schum. in Pflanzenreich 20 (1904) 398; Ridl. Mater. Fl. Malay Penin. 2 (1907) 24.

C. arabicus Linn. Sp. Pl. (1753) 2, in part.

C. crispiflorus Stokes Mat. Med. 1 (1812) 75.

C. glabratus Reichb. f. in Moessl. Handb. ed. 2, 1: 8, non Sw.

C. vaginalis Salisb. in Trans. Hort. Soc. 1 (1812) 277.

C. Loureiri Horan. Monog. (1862) 39.

C. foeniculaceus Noronha in Verh. Bataav. Genootsch. 5 (1795) 12.

C. nipalensis Rosc. Monandr. Pl. (1828) t. 80; Horan. Monog. (1862) 37; Regel Gartenfl. 4 (1855) 341, t. 139.

Banksia speciosa Koen. in Retz. Obs. 3 (1783) 75.

Amomum hirsutum Lam. Ill. Gen. 1 (1791) t. 3.

A. arboreum Lour. Fl. Cochinch. 1 (1790) 9.

Hellenia grandiflora Retz. Obs. 5 (1786) 18.

Stems 2 to 3 m tall, 1 to 2.5 cm thick, covered with dull-brown sheaths, often branched above and spiral. Leaves oblong or lanceolate, acuminate, 15 to 20 cm long, 6 to 7 cm wide, the upper surface glabrous, dark-green, beneath more or less pubescent; petiole 3 to 6 mm long; ligule short, annular, reddish. Spike terminal, ovate or oblong, 7 to 13 cm long. Bracts ovate, mucronate, not pungent, red, 2 cm long, glabrous or pubescent. Bracteole shorter, lanceolate, acute. Calyx short, cartilaginous, red, the lobes very short. Corolla-tube short, the lobes equal, mucronate, white, often rose-tinted. Lip very large, obovate, convolute, 9 cm long and wide, white with usually a longitudinal central yellow bar. Stamen 4.5 cm long, the filament broad, hairy on the back, the crest oblong, acuminate, orange beneath. Capsule 1.3 cm long, woody, red. Seeds small, black, with a white aril, 4 or 5 in each cell.

LUZON, Province of Cavite-Batangas, *For. Bur.* 7646 Merritt; Province of Bataan, *For. Bur.* 196 Barnes, *Elmer* 6707, *For. Bur.* 2771 Meyer, *Williams* 312, *For. Bur.* 2460 Borden; Province of Rizal, *For. Bur.* 3426 Ahern's collector; Province of Tayabas, *Gregory* 80, *Whitford* 830; Province of Batangas, *Cuzner* 21. LEYTE, *Elmer* 7363. MASBATE, *Merrill* 3393, *For. Bur.* 1696 Clark. CEBU, *Bur. Sci.* 1727 McGregor. MINDANAO, Lake Lanao, *Mrs. Clemens*. BASILAN, *Hallier* s. n.

Var. *argyrophyllus* Wall. Cat. 6555; Baker in Hook. f. Fl. Brit. Ind. 6 (1890) 250; Ridley Mater. Fl. Malay Penin. 2 (1907) 24.

Costus sericeus Blume Enum. Pl. Jav. 1 (1827) 62.

A more slender woodland form, with more branched stems, the leaves more pubescent, often silky on the back. Bracts and calyx less brightly colored. Flower-spikes and flowers smaller. Lip without the yellow central bar. Whole flower usually more distinctly pink-tinted.

MINDANAO, District of Davao, *Copeland* 448. Basilan, *DeVore & Hoover* 27. LUZON, Province of Bataan, *Bur. Sci.* 1588 Foxworthy. NEGROS, *For. Bur.* 5592 Everett.

India to Ceylon, Pegu, Tonkin, Formosa, the Malay Peninsula and Archipelago to New Guinea.

Considering the wide distribution of this conspicuous plant, it seems to vary but little, though Schumann describes six varieties, of which the woodland form of

the plant, var. *argyrophyllus*, is the only at all distinct one, and there are intermediate forms between the large typical form and that. The chief variations in the plant lie in the amount of pubescence, the size of the flowers and of the spike, the amount of rose-tinting of the corolla, and the amount of yellow in the lip.

2. *C. Clemensae* sp. nov.

Rhizome woody. Stem 1 m or more tall, thick. Leaves oblanceolate, acuminate, narrowed at the base, 12 cm long, 4 cm wide, the upper surface glabrous except the midrib, the lower surface covered with appressed, silky hairs; sheath 2 to 4 cm long, ribbed, thickly hairy; ligule ciliate; petiole densely hairy. Inflorescence from the rhizome, the peduncle thick, about 3 cm long, covered with sheathing bracts, hairy. Spike 8 to 10 cm long, 7 cm thick, red. Bracts lanceolate, closely ribbed, silky-hairy, 3 cm long, 1 cm wide, with a stout thorn-like mucro 5 mm long. Inner bract similar but narrower, 2.5 cm long, 4 mm wide. Calyx tubular, with three short, ovate, mucronate, pungent lobes, densely hairy, 3 cm long, 1 cm thick. Corolla white, the tube shorter than the calyx, hairy, the lobes linear-oblong, acuminate, acute, densely hairy outside, glabrous within, 2 cm long, nearly 1 cm wide. Lip 3 cm long, the center fleshy-papillose, the margin undulate, crisped, glabrous. Stamen shorter, the anther linear-oblong, the connective linear-oblong, the apex subacute, 1 cm long. Stigma very large, flabellate, reniform, the margins ciliate.

MINDANAO, Lake Lanao, Camp Keithley, Mrs. Clemens 1173.

A very striking plant with the habit of *Costus globosus* Blume, but distinct in its pubescent white corolla, very long connective-crest, and large reniform stigma.

MARANTACEÆ.

16. *DONAX* Lour.

Stems tall, shrubby, much branched. Leaves ovate or oblong, the petiole short; ligule none; sheaths long. Panicles erect or pendulous, lax. Bracts narrow-lanceolate. Flowers small, white. Corolla-tube usually long. Staminodes obovate, unequal. Ovary 3-celled, the cells 1-ovuled. Style stout, incurved. Fruit usually indehiscent, 1- to 3-seeded, globose or trigonous. Seeds globose or hemispheric.

Species 5, Indo-Malayan.

1. *Donax cannaeformis* Rolfe in Journ. Bot. 45 (1907) 243.

Thalia cannaeformis Forst. f. Fl. Ins. Austr. Prodr. (1790) 1.

Ilythuria cannaeformis Raf. Fl. Tellur. 4 (1836) 51.

Actoplanes cannaeformis K. Schum. in Pflanzenreich 11 (1902) 34.

Donax arundastrum K. Schum. in Pflanzenreich 11 (1902) 33, *quoad philippinense*, non Lour.

Stems 2 to 3 m tall. Leaves ovate, thin, glabrous, 15 to 18 cm long, 9 cm wide; petiole 1 cm long. Panicles 15 cm long or less, few-branched, the nodes hairy. Bracts papery, lanceolate, acute, 3 cm long. Flowers white, 3 cm long. Calyx-tube 1 cm long, the lobes lanceolate, acute, ribbed. Corolla-lobes linear-oblong, longer than the tube. Staminodes

obovate, large. Lip smaller, entire, obovate, clawed. Anther linear, the filament and lobe linear, the lobe long, linear, obtuse. Ovary silky. Fruit sparingly hairy, globose, 1 cm thick, 1-seeded. Seed oblong, rather strongly wrinkled.

LUZON, Province of Laguna, *Cuming* 465: Province of Isabela, Casiguran, *Bur. Sci.* 2988 *Mearns*: Province of Cavite, *For. Bur.* 7619 *Rosenbluth*: Province of Laguna, *Bur. Sci.* 6022 *Robinson*: Province of Benguet, Sablan, *Elmer* 6104: Province of Pampanga, Arayat, *Merrill* 1412: Province of Bataan, *Merrill* 1546, *Whitford* 59, *Williams* 4: Province of Nueva Viscaya, *Merrill* 230: Province of Tayabas, *Gregory* 100. MINDORO, *For. Bur.* 3690 *Merritt*; Paluan, *Merrill* 945; Pola, *Merrill* 2453. CULION, *Merrill* 660. PALAWAN, *Bur. Sci.* 763 *Foxworthy*, *Bur. Sci.* 303 *Bermejos*. BALABAC, *Bur. Sci.* 454 *Mangubat*. CAMIGUIN, Babuyan Islands, *Bur. Sci.* 3933 *Fénix*. MINDANAO, Davao, *Copeland* 445, *De Vore & Hoover* 198, 240: District of Zamboanga, *Copeland* s. n.: Province of Misamis, *For. Bur.* 4744 *Mearns & Hutchinson*: Lake Lanao, *Mrs. Clemens* 90.

Java and Celebes to New Guinea.

D. cannaeformis Rolfe most closely resembles *D. grandis* Ridl. in its size and fruit, but is easily distinguished by its larger flowers, its stamen with a long-linear lateral lobe, its silky-pubescent ovary, and its fruit covered thinly with hairs. The seed is more oblong and wrinkled.

K. Schumann in *Pflanzenreich* 11 has made a sad mixup in this simple genus. At present only four species are known, as follows:

D. arundastrum Lour., a dwarf plant with larger flowers than the others, and a turbinate 3-seeded fruit. It is abundant on river banks from Siam, Cochinchina and India to the Malay Peninsula.

D. parviflora Ridl., a native of the Malay Peninsula.

D. grandis Ridl., a very large plant, with globose, glabrous, 1-seeded fruits and smaller flowers, ranging from Siam to Singapore.

D. cannaeformis Rolfe, ranging from Java to New Guinea and the Eastern Archipelago, an often tall plant with larger flowers than *D. grandis*, and 1-seeded hairy fruit.

17. PHACELOPHRYNIUM K. Schumann.

Tufted herbs with long-petioled leaves. Inflorescence a dense or interrupted panicle of spikes, with distichous bracts, from a leaf-petiole. Flowers in pairs or threes, pedicellate. Bracteoles two to each flower. Sepals linear or subovate. Corolla-tube short or very short, the lobes oblong. Lip with an oblique villous ridge. Petaloid stamen spathulate or ovate, cucullate, short. Ovary 3-celled. Capsule 3-angled, 3-, rarely 2-seeded. Seed 3-angled.

Species 7, Nicobar Islands, the Malay Peninsula and Archipelago.

1. *P. interruptum* K. Schum. in *Pflanzenreich* 11 (1902) 121.

Stems 2 to 3 m tall. Leaves lanceolate or elliptic-lanceolate, 30 cm long, 9 to 11 cm wide, glabrous; petiole 3 to 5 cm long; sheath glabrous. Inflorescences usually three, interruptedly paniced, 12 to 20 cm long, the internodes about 8 cm long, the racemes fascicled, fairly dense, four together, 5 cm long. Primary bracts oblong-lanceolate or ovate, 4 cm long or less. Floral bracts about 8, oblong, obtuse, fleshy, 1 cm long. Flowers yellow, in pairs on pedicels 5 mm long. Ovary triquet-

rous, pear-shaped, glabrous, trilocular. Sepals ovate-oblong, acuminate, 4 mm long. Corolla-tube hardly 2 mm long, the lobes oblong. Outer staminode 3 mm long. Lip with a villous callus. Capsule trigonous, faintly wrinkled, 3-seeded, apex depressed. Seeds chestnut, transversely furrowed, with a short bilobed aril.

LUZON, Province of Cagayan, Enrile, (*Warburg 12160*): Province of Laguna, *Hallier*: Province of Rizal, Santander, *Bur. Sci. 3282 Ramos*; Montalban, *Merrill 5058*; (*Warburg 12495*); Bosoboso, *Bur. Sci. 1041 Ramos*; Tanay, *Merrill 2263*: Province of Tayabas, *Merrill 4014*: Province of Benguet, *Elmer 8955*: Province of Sorsogon, *Elmer 7310*. NEGROS, *Copeland*. SAMAR, *Merrill 5231*. LEYTE, *Elmer 7297*. MINDANAO, District of Davao, (*Warburg 14585*), *Copeland 469*.

Endemic.

2. **P. bracteosum** K. Schum. l. c. 123.

A small loosely tufted plant 1 m tall. Leaves glabrous, long-petioled, the petiole 40 cm long, the knee 4 cm long, the lamina ovate or elliptic, subacute, 30 cm long, 15 cm wide. Peduncle 30 to 45 cm long. Spikes three or four, oblong, 5 cm long or more, about 3 cm apart. Bracts linear-oblong, 3 to 4 cm long, pale. Flowers in pairs, shortly pedicelled. Bracteoles keeled and hairy. Ovary trilocular, thickly hairy. Sepals very narrow, linear-lanceolate, acute, 10 mm long. Corolla-tube rather thick, 1.5 cm long, hairy, the lobes short, rounded. Capsule 1- to 3-seeded, obliquely ellipsoid or rounded, 3-angled, appressed-villous. Seeds 7 mm long, smooth, yellow, the aril bilobed.

LUZON, Province of Camarines, (*Cuming 1466*): Province of Albay, (*Vidal 3976*). MINDANAO, District of Davao, (*Warburg 14615*): Lake Lanao, *Mrs. Clemens 423*. SAMAR, *Merrill 5206, 5232*. LEYTE, *Elmer 7294*; (*Cuming 1756*).

Endemic.

18. **PHRYNIUM** Willd.

Tufted herbs with long-petioled ovate or oblong leaves. Inflorescence capitate, produced from the side of the petiole, with a few large outer bracts and containing numerous flowers, solitary or in pairs or threes on short peduncles. Sepals linear or oblong. Corolla-tube a little longer, the lobes oblong or ovate. Lip usually shorter, with a transverse callus, cucullate, short. Ovary trilocular. Seeds 1 to 3, ellipsoid, triangular, with a thin dry aril.

Species 12, Indo-Malayan.

1. **P. philippinense** Ridl. in *Elm. Leaf. Philip. Bot.* 2 (1909) 570.

Whole plant about 1 m tall, the rhizome thick, with stout roots emitting many fibrils. Base of sheaths silky, the leaf-stalk to the flower head up to 50 cm long, stout, hairy, above the inflorescence 20 cm long, the lamina 30 to 40 cm long, 15 cm wide, glabrous, oblong-elliptic. Capitulum large, 3 cm thick in flower, 5 cm in fruit. Bracts oblong, ribbed, soon breaking into fibrils at the tip. Bracteoles similar. Flowers white and pink, in pairs, shortly (1 mm) stalked. Ovary silky. Sepals linear, acute, closely ribbed, hairy only at the tip, longer than the corolla-tube.

Corolla-tube dilated upward, the lobes obovate, spathulate, hairy at the tip. Stamines thin, rounded, obtuse. Cucullus small, side-lobe linear-oblong. Anther very short, the connective wing large, subtriangular. Lip small, oblong, truncate, almost quadrate, the crest large, semiovate, the longitudinal ridge silky. Capsule oblong, red, 1 cm long, hairy. Seeds nearly 1 cm long, obscurely rugose-tubercled.

LEYTE, Palo, *Elmer* 7289. NEGROS, Gimagaan River, *Whitford* 1658. MINDANAO, District of Davao, Todaya, *Copeland* 1248. MINDORO, Alag River, *Merrill* 6132; Baco River, *McGregor* 314, *For. Bur.* 6780, 12103 *Merritt*. BATAN, *Bur. Sci.* 6260 *Robinson*. LUZON, Province of Isabela, Casiguran, *Bur. Sci.* 3100 *Mearns*: Province of Tayabas, *Whitford* 634. CAMIGUIN, Babuyan Islands, *Bur. Sci.* 3936 *Fénix*.

This species is most nearly allied to *P. malaccense* Ridl. of the Malay Peninsula, differing in its more glabrous leaves, nearly glabrous sepals, and in the form of the lip. It has been confused with *P. capitatum* Willd., a Chittagong plant which has purple, sessile flowers.

Endemic.

19. MONOPHYNIUM K. Schum.

Tall herbs, the leaves long-petioled. Panicles numerous, from a leaf-sheath, peduncled. Spikes narrow, fascicled, densely imbricate. Bracts small. Flowers solitary in each bract, with a two-keeled prophyll and mesophyll. Sepals small, lanceolate. Corolla-tube as long, the lobes lanceolate. Outer stamens 2, obovate, a little longer than the corolla-lobes. Cucullus much shorter, with a subauricled appendage. Ovary 3-locular, with ovules in all the loculi.

Species 3, endemic.

1. *M. fasciculatum* K. Schum. in *Pflanzenreich* 11 (1902) 68.

Calathea fasciculata Presl Rel. Haenk. 1 (1827) 108, t. 16, f. 1.

Phrynium fasciculatum Horan. Monogr. (1862) 11.

Two meters tall. Leaves oblong or subovate-lanceolate, attenuate-acuminate, base rounded, glabrous on both sides, 30 cm long, 8 cm wide; petiole 20 cm long, the upper part 4 cm long, flattened, glabrous. Panicles 3 or 4, subsessile, or with an 8 cm long peduncle, the racemes narrow, 6 cm long. Bracts 10, ovate-oblong, obtuse, 9 mm long, glabrous. Ovary silky. Sepals lanceolate, 4 mm long. Corolla-tube 3.5 mm long, the lobes 5 mm long.

LUZON, (*Haenke*); (*Warburg* 14068): Province of Tayabas, (*Warburg* 12921), *Elmer* 9148.

Halmaheira.

2. *M. simplex* Elmer Leaf. Philip. Bot. 1 (1908) 276.

A tufted plant 1 to 1.5 m tall, glabrous. Leaves thin, elliptic, cuspidate, 18 to 20 cm long, 7 cm wide, base cuneate, the upper surface glabrous, beneath strigose on the nerves, knee 1 cm long, the petiole 50

cm long, rather slender above. Inflorescence of two or three 9 to 12 cm long branches on a peduncle about 15 cm long, yellowish- or grayish-hairy when young, becoming subglabrous. Bracts 1 to 2 cm long, lanceolate, obtuse. Flower spikes remote, 4 to 6 on a branch, the outer bracts lanceolate, 1 cm long, glabrous. Peduncle short, at first erect, afterwards decurved, pubescent. Calyx 3-lobed, lanceolate, acuminate, tip blunt, pubescent. Corolla white, longer, segments ligulate. Stamines obovate, petaloid, obliquely truncate, a little longer, spotted. Cucullus short, rigid. Capsule 8 mm, roundly triangular, apex truncate, 3-celled, 3-seeded, the seeds angled, truncate, with a thin aril.

LUZON, Province of Tayabas, Lucban, *Elmer* 9147, 7611.

3. *M. congestum* sp. nov.

About 1 m tall, tufted. Leaves thin, lanceolate, acuminate, cuspidate, base cuneate, glabrous on the upper surface, hairy beneath, 30 cm long, 6 cm wide; petiole slender above, 55 cm long including the sheathing portion, pubescent. Inflorescence extruded at two-thirds the distance from the base, a dense head of small spikes about 2 cm in diameter. Peduncles 1 cm long, slender, angled. Bracts lanceolate, hairy, with a tuft of long hairs at the tip. Inner bracts short, oblong, obtuse. Sepals oblong-lanceolate, blunt, ciliate at the tip, half as long as the corolla-tube. Corolla-tube cylindric, the lobes as long, linear-oblong, obtuse. Lip obovate, clawed, the limb oblong-obovate, rounded, entire, with a rather large, semiovate, transverse ridge. Cucullus subspathulate, side lobe decurved, blunt, spotted. Stamen spathulate, the apex dilated into two wings. Style thick, the apex bent an angle and with a thick process at the bend.

LUZON, Provinces of Laguna-Tayabas, from Paete to Piapi, *For. Bur.* 9548 *Curran*.

Easily distinguished by its inflorescence, and allied to a Bornean species.

MARANTA Linn.

Maranta arundinacea Linn., the arrow-root, is cultivated in the Philippines, being locally known as *Arourou*.

CANNACEÆ.

20. **CANNA** Linn.

Rhizome perennial. Stems simple, leafy. Leaves large, ovate or lanceolate, acute. Raceme terminal, simple or branched. Bracts small, ovate. Flowers in pairs. Sepals three, lanceolate to oblong. Corolla-tube cylindric, short, the lobes 3, equal, lanceolate. Staminal-tube cylindric, short, the segments petaloid, unequal, a one-celled anther attached to one lobe. Ovary 3-celled, many-ovuled. Style adnate at the

base to the staminal tube, free above, linear-oblong. Capsule oblong or globose, echinate. Seeds large, globose, exarillate.

Species 20 or 30, tropical American, a few species now widely dispersed in the tropics of the World in a half-wild condition. I doubt if any of the species of the genus are indigenous to the Old World. *Canna indica* Linn. occurs all over the tropics near villages, and similarly met with, but less abundant, are *Canna edulis*, *C. glauca*, and *C. Warszewiczii*.

1. *C. indica* Linn. Sp. Pl. (1753) 1, in part: Roxb. As. Research. 9: 322; Fl. Ind. 1 (1820) 1.

C. orientalis Rose. Monandr. Pl. (1828) t. 12.

Stems 1 to 2 m tall. Leaves ovate or lanceolate, broad, acute or acuminate. Racemes 15 to 25 cm long, the flowers red, in pairs, the pedicels short. Bract thin, oblong, white, truncate, 1 cm long. Bracteoles two, smaller, ovate, acute, thin, white. Calyx lobes three, lanceolate, acute, greenish. Corolla-tube as long. Petals lanceolate, acute, red, about 4 cm long. Staminodes spatulate, unequal, bright-red, 5 cm long, nearly 1 cm wide. Lip recurved, linear-oblong, emarginate or not, 3.5 cm long, red, or with a central yellow band with red streaks. Stamen linear, shorter, about 2 cm long. Style linear, oblong. Capsule oblong.

LUZON, Province of Pampanga, *Bolster* 46: Province of Tayabas, *Whitford* 551: Province of Bataan, *For. Bur.* 2012 *Borden*: Manila, *Merrill* 60. BATANES ISLANDS, *Bur. Sci.* 3715 *Fénix*. NEGROS, *For. Bur.* 5237 *Everett*. PALAWAN, *Bur. Sci.* 231 *Bermejos*. MINDANAO, Lake Lanao, *Mrs. Clemens* 188.

2. *C. glauca* Rose. Monandr. Pl. (1828) t. 13.

Stem 1.5 to 2 m tall. Leaves lanceolate, acuminate, margined with white. Inflorescence branched, with long glaucous sheaths on the branches. Bracts glaucous, broadly ovate, thin. Calyx-lobes oblong, rounded, 1 cm long. Corolla-tube as long, the lobes linear, acute, nearly 5 cm long, yellow. Staminodes oblong, dilated a little upward. Lip oblong, cuneate, retuse, 6 cm long, 1 cm wide, yellow, with faint reddish splashes. Stamen linear, nearly 3 cm long. Style linear, equally long. All yellow.

Manila, *Merrill s. n.*, with *C. indica*, but rarer.

MUSACEÆ.

21. *MUSA* Linn.

Tall herbs with broad, oblong leaves of great size; sheaths very large, enveloping each other. Inflorescence terminal, racemose, with large, ovate bracts. Flowers unisexual, the females at the base, the males at the apex, in short half-circles on a stout rachis. Calyx tubular, 3- to 5-toothed, split down one side. Corolla as long, tubular. Stamens 5, perfect, the sixth rudimentary or absent. Filaments filiform. Anthers

erect, linear, 2-celled. Style filiform. Stigma capitate, 6-lobed. Fruit an oblong, fleshy, trigonous or cylindrical many seeded berry.

Species 35, tropics of the world.

There are no specimens of any species in the collection I have received, although many forms of *Musa sapientum* Linn. and *M. paradisiaca* Linn., occur in the Philippines in cultivation, and doubtless some endemic species other than the following, the well-known Manila Hemp plant, *Musa textilis*, which I here describe from plants cultivated under that name in the Botanic Gardens at Singapore.

M. textilis Née Ann. Cienc. Nat. 4 (1801) 123; K. Schum. Pflanzenreich 1 (1900) 19.

M. mindanensis Miq. Fl. Ind. Bat. 3 (1855) 588.

M. sylvestris Colla Mém. Gen. Musa (1820) 58.

M. troglodytarum var. *textoria* Blanco Fl. Filip. (1837) 247.

M. abaca Perr. Mém. Soc. Linn. Par. 3 (1824) 130.

Stems tufted, cylindric, about 6 m tall, and 19 cm in girth. Leaves narrowly linear-oblong, cuspidate, 3 m long, 30 cm wide, nerves conspicuous, parallel, light green on both sides; petiole long. Spike pendulous. Bracts lanceolate, obtuse, 20 cm long, 8 cm wide at the base, coriaceous, dull-brownish-red. Bud acute. Female flowers in three or four half-whorls, two rows in each whorl. Male flowers very numerous, in double whorls, 6 flowers in one series, 3 in the other, white; outer perianth-lobe 3 cm long, stiff, yellowish-white, base yellow, with three cuspidate teeth, recurved; inner thinner, saccate, pure white, 2 cm long, apex truncate, with two denticulate lobes at the corners. Stamen-filaments linear, white, 2 cm long. Anther a little shorter, linear, cells brownish. Fruit subcylindric, narrowed at both ends. Seeds globose, flattened, small.

Philippines.

Musa coccinea Andr. is cultivated as an ornamental plant the entire inflorescence cardinal-red, (Negros, Dumaguete, *Elmer* 7836), a native of southern China and CochinChina.

Ravenala madagascariensis J. F. Gmel. the "traveller's palm" is cultivated for ornamental purposes in Manila.